

THE PATTERN OF WAR

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*With eleven sketch-maps
in the text*



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*Dedicated to those who sometimes feel
homesick for the old free life of the
Desert and especially to John Blundell,
a brave man who abides there*

L.E.T.

Gallipoli, 1915

L.H.T.

Normandy, 1944

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INTRODUCTION

SOME were surprised, in 1915, that the war on the Western Front developed into a war of linear stagnation : they were surprised in 1939-40 that war became a war of manœuvre.

This small book sets out to show five things.

The first, that there is and always has been a traditional pattern of war, a pattern that is to be seen not only in the form in which warfare manifested itself throughout such wars of manœuvre as those of the 18th century in Europe, but far back through the ages, to the days of Hannibal and earlier. From this, too, we can see a quite astonishing consistency in the manner in which battles developed and were fought.

The second, that it is therefore possible for a soldier to forecast of what nature the next war will be, whether it will be of this traditional pattern or of one less mobile and inspiring.

The third, that only by a close study of his own profession, and a very fair knowledge of the society, national and international, and of the world in which he lives, will the soldier be able to make a sufficiently clear forecast.

The fourth, that by this study of Military Science he can help his nation to prevent war ever again occurring.

The fifth and last, that the nation has, therefore, a duty towards him and itself to encourage him to make this study of Military Science.

Throughout the book the reader will see how little real study we soldiers have made of war in the past thirty years. What names can we recall of well-known, modern soldier-writers ? One was J. F. C. Fuller, and he left our army of his own free will, for he was not satisfied ; Liddell Hart, soldier, civilian, military critic and historian, has influenced considerably our study of war and encouraged others to pursue the learning

of Military Science. Both have done great service. Ought they not to have been able to do that service as well inside the army as outside of it? Would it have mattered if their vigorous writing and their fresh theories found some of us in disagreement?

These two—and perhaps a couple more—are indeed all of whom we have heard much. It is a sad commentary on our lack of interest and enterprise, both in the army and in the nation. We are too fond of believing that it is the German or the Frenchman who knows all that is to be known about making land warfare. It is an expensive method of learning war to get to know it at second-hand, for in this way we come to know only of those things that other nations have already learned; by the time we have mastered them they have passed on to other and newer things. They have produced next year's model.

We have our own methods of making land war; we have had to make it often enough in the past; we will have our own methods for making it in the future. But it is just as well to be aware of how we will make it, for it costs us very dearly each time we enter war without that knowledge.

I hope there will never again be war. Later in this book the reader will see why I believe that there are grounds for this hope. I belong to a generation of soldiers whose lives have been made a nightmare by these two awful periods of horror and death. I am certain that only those who have personally looked upon a stricken bombed area or a fully-harvested battlefield can possibly conceive the abomination of it all. To keep the peace in the Empire was all that we who joined the army before 1914 had expected to have to do. We were sadly mistaken, and many of us know that it was carelessness and self-deception on the part of our nation that threw us into the maelstrom. Too many of us accepted that carelessness at its face value, we were equally deceived by the nation's self-deception, and thought there would be no need to take our profession seriously. "It will never happen again," some thought. We have tried to stop "it" from happening by ignoring "it". We have failed. That is our lesson. Let

us face the issue squarely and stop "it" from happening again by knowing all about it and being ready for it.

The atom bomb burst in August, 1945. No thinking soldier could have been surprised at that. What is to be its effect on the operations of war? Let us try to forecast as well as we can at this stage what the effect will be, and how war, if there is ever to be another war, will be fought. We will talk to the physicist about this.

If the reader finds these pages of sufficient interest to read to the last, let him satisfy himself whether I have clearly shown the things that I set out to show, and whether I have persuaded him that we must continue, and with greater care and industry, in the study of the Science of War.

LUCKNOW,

November, 1945.

F. S. T.

I

MILITARY CRITICISM

Whoever appeals to authority applies not his intellect but his memory. (Leonardo da Vinci.)

BEFORE opening my argument I must say a few words on the subject of criticism.

No military writer can fail to criticise if he is to get at the truth. He must start with an analysis and then, by discussion of the facts and motives that he has discovered, pass on to criticism. From that point he is to advise a better way of doing things, both in the present and in the future. Personalities do not matter to him except in so far as the abilities and character, planning and actions of the commanders affect the purpose of his examination. It follows, therefore, that names only concern him where they "docket" in history the particular type of operation that he is studying.

So it is with the present study. It is the operations which concern me and not the men who fought them. Only by taking that attitude can I write at the present time, while the scene is close to us and memory honestly serves.

In our army it is held as somewhat out of place to criticise ; yet, in our life within the great British democracy criticism is held to be necessary, common and usual. We soldiers have yet to strike the mean ; we have lost much of good and caused real frustration by suppressing the honest comment of the few students of war we possess. Criticism has got to be encouraged and those who have something useful in this way to offer must feel reassured that even if what they say is against the policy or views of our hierarchy they will not themselves suffer in their careers for saying what they believe to be true. Officers of today join the army for a living, and have no private income with which to protect their livelihood and provide for their

families. If our treatment of the honest and skilled dissident is not to be liberal, then the army will be filled with more time-servers than in the past and will stagnate, to the great waste of the nation's treasure and, later, of its life. Surely we have learned our lesson in this last calamitous struggle.

"I tell you there is something splendid in a man who will not always obey. Why, if we had done as the kings had told us five hundred years ago we should have all been slaves. If we had done as the priests told us we should have all been idiots. If we had done as the doctors told us, we should have all been dead. We have been saved by disobedience." Thus wrote Robert G. Ingersoll.

A leading psychologist, William McDougall, in *Character and the Conduct of Life*, holds the opinion that it is incorrect to say that only those can command who have learnt to obey. He cites Nelson and other great leaders of conspicuously independent character and points out that it is self control that is the essential quality in those commanders who are independent enough not to obey (and who have the professional knowledge to justify their disobedience).

Judgments on the campaigns and battles of this war should have at least the merit that they are not that easy refuge, wisdom after the event. They gain influence the more they are founded on previous knowledge.

Any body which resents or debars reasoned and balanced criticism has something to fear ; it must doubt its own honesty of purpose or its competence ; otherwise it would be only too ready and agreeable to answer the critic and prove him to be wrong. Perhaps the army needs a separate branch in peace time to handle informed public criticism and to promote and guide its own criticism from within. It is certain that while the army is a closed shop the nation takes no interest in it. Open the service up to criticism on its professional methods and ways, and the press will be interested. This will do good. In the recent past we have had no true criticism other than in the shape of questions in Parliament, many of them on matters of little real moment to the progress of the army, or in letters to the press on the minor peccadilloes of a few individuals.

We can usually do without these ; we need a real interest to be taken in an absorbingly interesting profession and one that is only too vitally important to the nation. The acceptance of conscription in peace time, even if it were to have no other useful result, will encourage the nation at large to keep its army's more important affairs under the bright light of a critical examination. For this examination the nation must inform itself.

Wisdom after the event is an expensive wisdom. One ounce of imagination and foresight is for our army worth ten tons of experience, for experience for us is always bitter. In long periods of peace our army is beating the air, that is, it cannot possibly see the result of what it is doing, of what it is teaching, of what it should be doing for the latest developments in weapons and methods. In most other professions to be right or to be wrong is adjudged by the obvious results of what is said or done. It may be the production of some new textile which will yield a great harvest of money, or the acceptance by fellow sages of some new philosophical thesis. There is only one way in which an army can possibly know whether what it projects in peace time will be right for future war and that is by constant and free discussion of all new ideas, new suggestions and new designs. If the discussion is sufficiently open and if, in the end, authority itself brings the matter, when fully ventilated, before its governing body for sympathetic examination, then the army will have some means of obtaining progress and of judging whether what it projects in peace will be advantageous for war. Only by such discussion can we ever get forward, for in peace we cannot apply the terrible weapons at our disposal and prove them against an enemy who in his turn has his own methods and will react in his own particular way to what we do.

In order to promote discussion, it is necessary that our military journals shall be more lively to all things new, more able to interest the army at large. They must be prepared to take a line not necessarily in favour with those of us who are at the top of the fighting forces.¹ The "Yes-man" is more

¹ During World War II there was a welcome improvement in some of our military journals, especially in India. There are signs of the im-

dangerous when he is an editor of a service periodical than when he is a subordinate in the army itself. We have to remember that whether we are at the top or bottom it is only by rubbing our wits up against the wits of others who hold varying views that we can sharpen them. A man must fear something if he is not prepared in peace time to discuss his opinions on matters of importance with both his seniors and juniors. He has much to gain from what he will hear in the course of the discussion.

I repeat most emphatically that it is foresight and imagination alone that will keep the army up-to-date and, we hope, ahead of all other armies at any rate in thought if not in the material which the nation may be unwilling to provide.

In these pages I speak of each problem as it has presented itself at the time, or as I saw it at the time, and of the methods that would have then solved the problem. I do not speak of solutions that would have been better had superior weapons or transport been available.

War is a detestable thing, and the more one fights, the more hateful it seems. The soldier who has fought much and yet writes of war is not necessarily a militarist. He is concerned to understand war only that he may know how to prevent it, and that he may be able to invoke the help of others in its prevention. War will continue until one of two things happens. National boundaries and national jealousies must cease to exist, or all nations of the world must develop a national conscience. If both these come about, so much the better. No nation can develop a national conscience unless all within it take full part in the government with absolute freedom of speech. Until this comes about there will be peoples amongst whom there is no national forum and where there is, therefore, no national conscience and no national means of determining right from wrong. Right and wrong will be the right and wrong of a few, forced upon or blindly accepted

provement going forward into the post-war years. Let us hope that every official encouragement and help will be given to the expression of progressive thought in these journals and that no official brake will ever again be applied by direct or indirect means.

by the many ; there will be secret opinions and secret policies among the rulers. No nation that has not a national conscience is safe to those who have one, any more than a member of some secret society can be other than a menace to the general trusting public. In Sanskrit the word " Asuric " means power without conscience : " Dharma " is power with conscience. It is the former that rules most nations, only a few obey the latter.

It is only with a system of what is loosely termed " democracy " that the national conscience can develop, but it seems that there are only a few races who are capable of running a democracy. One of those few is the British. They are a people who are temperate, and who do not allow their passions to override their knowledge of justice and their reason. They are able to conduct orderly discussion on matters of importance on which the opposing sides hold completely different views. What other nation can do this ?

The democratic system of government, of society, springs from the very nature of a people itself. It is, therefore, unreasonable to thrust such a system upon a people and expect them to maintain it. Moreover, the democratic system is not definable, for it constantly evolves, develops and progresses. This continual changing is inherent in it, since it must develop as the people develop and it is thus contrasted with any form of despotism. History shows that a long period of self-training and self-discipline is needed in order to produce a people who will desire and will build and successfully maintain a democratic system.

" It is ordained in the eternal constitution of things that men of intemperate minds cannot be free : their passions forge their fetters." Thus Edmund Burke. The Japanese and Germans were given absolute liberty and self-government. They were not fit to enjoy liberty and brought upon the world the greatest disaster in history. They were and are an intemperate people who forged for themselves fetters which they sought to bind upon the rest of the earth. If such liberty is given to other races as intemperate as the Germans then there will be war. Liberty is not a thing to which every would-be

evil-doer or unbalanced individual or people is by right entitled. It is a privilege that must be deserved.

The benevolent despot or the one-party system is no alternative to government by the voice of all the people, a beautiful thing as Herodotus tells us. The despot will change, his successor may be a tyrannical wretch : the one-party system of today is only an extension of personal despotism, rendered necessary by the size of the country which it has to control. War may break out at any time with governments such as these and thus it becomes a soldier's duty to study war. He is paid to study it ; otherwise the nation could save money in peace time by disbanding an army that was unintelligent and uninstructed. Since, however, it pays for this expensive thing it must encourage it to be good at its job and must know that only by the expression of its views in service and public journals can it prove itself a good servant. We must expect that in future those in the army will have some liberty in the expression of their views. This does not mean that we must allow the airing of personal complaints as in our present army papers (1945)—complaints which should go through the ordinary army routine and be dealt with by capable, experienced and devoted leaders whose care is for those who are serving beneath them.

II

THE NATION AND ITS FIGHTING SERVICES

War is a great affair of state, the realm of life and death, the road to safety or ruin, a thing to be studied with extreme diligence.
(Sun Tzu, about 500 B.C)

THERE is no manner of doubt that we entered this last catastrophic war blind to the pattern which it would assume. We were also blind to the pattern which the war of 1914-18 would show. Are we always to be unable to forecast the future of War? My own view is most emphatically that it is not only possible to forecast the general pattern of war as it will have to be fought, but that it is not very difficult to assure oneself even as to the nature of the battles that we will have to fight within that greater strategic conception of the future.

I propose, in this book, to show, in the first place, that there has never in our time been anything but the most superficial study of war. Thereafter, I shall show that throughout the ages there is an almost unbroken consistency in the pattern of war : moreover, that even the pattern of battle has shown, and still shows today, a remarkable consistency in the manner in which it is fought. From this it will be obvious that, as in the past, it should have been possible to forecast the future of war, so it should be possible for us today to forecast its coming pattern. The pattern is traditional and classic ; only in very exceptional circumstances can it change. Those circumstances I shall define very shortly and, I hope, quite clearly. In order, furthermore, to demonstrate the evolution that is coming about today, I shall examine briefly the effect of the coming of great air power and air transport on the strategical and political geography of the world, governed as it is by this

new phenomenon of air conquest and by the phenomenon, which all of us must have been watching with great care, *that war now takes place from the interior of one country into the interior of another and not against its land borders.* However fantastic this latter phenomenon may appear, it is only the logical outcome of the airman's influence on history.

The twenty years between 1919 and 1939 may aptly be termed the Ice Age of military thought. There was virtually no study of war whatsoever.

One reason for this was that our regular officers were, to a great extent, only part-time soldiers. One may well say that no officer should hold any rank above that of lieutenant-colonel unless he is a military scientist. How many of us can truthfully say that we have this qualification? The senior regular officer must be a military scientist in at least one branch of war and that should be a branch that requires some scientific thought: it is better that he should be a scientist over the whole field of the military profession and a specialist in one particular branch. With the higher quality of intellect thus demanded and the necessity for serious application to the profession, we shall gather into the army a body of men who are at least the equal of those in any other profession and who may indeed be superior to many.

We may blame the regular officer for his failure to attain this standard, but the nation is far more to blame, and in particular those intelligent but inexperienced citizens who, by their loud clamour and aggressive—even abusive—vindication of their theories, imposed upon us a policy of disarmament.

I urge that the nation shall regard its fighting services as designed to prevent war and *not* to make war. Our soldiers can only prevent war if they are so well learned in their work that they can at all times, and in good time, advise our statesmen as to the methods by which, in their military opinion, protective and preventive action can be taken. But they need the encouragement of the nation and its sympathy, rather than its hostility and abuse in times of peace. Surely the bogey of the tyranny of Cromwell's generals has been laid by an army

which has loyally and disinterestedly upheld our constitution for two centuries, and has defended on world-wide battlefields the security of our people and the justice of our cause? At the beginning of each great war the Regular Army has suffered without complaint from the neglect of a nation : it has suffered in life and in prestige ; it has lost nearly all of the little that it has been able to build under great handicaps in peace time.

In the Ice Age, Disarmament was the avowed policy of the majority of the nation. I have something to say about Disarmament. In passing, I may remark that I do not know of any such thing in this world as passive Good ; I can only conceive of a Good that is active. When it is passive and folds its arms while it watches the oppression of the weak by the strong, then I can only assume that it condones the offence and is tacitly a party to it. Such a " Good " is therefore a party to Evil and is thus in itself wicked.

Disarmament has three forms. They are material disarmament, moral disarmament, mental or educational disarmament.

Of these three forms of Disarmament the material is, perhaps, the least dangerous. It simply means that during the days of peace we do not provide ourselves with sufficient equipment, or the right sort of equipment, to make ourselves ready for the first battle. Nor do we place behind our armies the factories and the national system required for the production of our material needs in increasing quantities as the war progresses. The worst aspect of this is that all research into warlike weapons and equipment is confined to a very small batch of experts, who are almost detached from the life of the nation and are without the assistance of the nation's own specialists and technicians.

Moral Disarmament is in the next degree more dangerous. It seems that the will to fight, which a nation must have if it is to play its part in the world, however seldom and however unwillingly it may bring itself to make war, is missing. It is missing because the general opinion of the nation is against the making of war in any circumstances. The fibre of the nation is sapped and its manhood softened by preoccupation with

the pleasures rather than the responsibilities of peace. These responsibilities can only be fulfilled by those who are prepared at all costs to themselves to see them through.

This Moral Disarmament brought us into the late war as a seemingly degenerate and certainly soft race. Lack of battle skill was indeed a great deal to blame for our very poor showing in our early campaigns, but any soldier who spent his life in India will confirm that, in comparison with others whom he saw on other military occasions, the British soldier did not make a good showing. The fault was not entirely his: his lack of endeavour was caught from the apathetic and pleasure-loving, self-indulgent people of his country of whom he was a fair specimen.

The third and most pernicious form of Disarmament is what I have termed Mental or Educational Disarmament. With the nation frowning upon any who thought the use of force might in some circumstances be right, and who therefore believed that it might be right at some time or other to declare war, there was no encouragement but rather a definite and abusive discouragement of those who dared at any time to write about a possible war and about the nature it might assume. There was, therefore, no study of war in the nation itself; not only that, but the nation resented that anyone else should publicly study war. If as a soldier he did study it, then he was at once labelled as a Blimp and was regarded by the civil population as something of a criminal.

Our army springs from our national life and is not imposed upon it.¹ It therefore has the habits and takes the fashions prevalent among the civil population. Too many of our officers regarded the study of war as something that was not very good form, while the behaviour of the men during their training made it only too evident that they regarded their profession as of little worth, and something of which they should be rather humble under the attention of the ordinary passer-by. Men who were seen drilling were regarded as so many

¹ Perhaps that is why Cæsar found our British forebears still using chariots when even the Gauls had long discarded this weapon as too difficult to handle in battle.

slaves, for they were supposed to obey precisely and at once the command of the uniformed despot.

For these reasons there was no study of war. Our country is now bled white and the fault for this does not lie with our regular soldier. It lies with those who are too foolish, too self-indulgent, too fond of their own comfort or too disinterested to acknowledge that the use of force is a thing that is sometimes fully justified. Maybe they forget that if a judge passes a capital sentence, the murderer does not of his own accord walk to the gallows, place a noose about his neck and make the final jump. He needs the compulsion of the policeman and of the executioner to get him to his last destination.

It is devoutly to be hoped that we have learned our lesson and in every possible way will encourage our officers to make a very complete study of war and be scientists in their profession. In this way, when we have at last recovered our prosperity, they may prevent us from being overwhelmed by a catastrophe which will throw us down for ever.

In return for this encouragement, the soldier must realise that his profession is not confined within the four walls of a barrack-room or within the limits of the manœuvre ground. His profession is a part, or growth, of the whole of our democratic system and its way of life. It is his duty, and it must be his pleasure, to make a study of political science, history, political geography, sociology, economics, science and especially physics. He must be in the confidence of our men of research, such as those in engineering and in all branches of science. It must no longer be regarded as "shop" to discuss in one's mess the higher needs of war and the more serious subjects that are of interest to every cultured and intellectual gathering. In this way we will cease to have a part-time army and at last become professional.

There is great need for military studies in the army, as the following pages will show.

III

THE POWER OF MANŒUVRE

AND now let us pass to a historical survey of war for the past two thousand years or so in order to ensure that we are right in claiming that war is waged on a traditional pattern from which there is seldom any material deviation.

The end of all war has been in the past, is today and, if ever there can be another war will be, the final land battle—the last act of what Jomini terms the impassioned drama of war.

That is the end to which the whole of the military endeavours and researches of a nation in peace time are devoted. That is the end to which the whole of our strenuous efforts in war, on the part of our nation and its three fighting services, are devoted. That is our final object and it will always be our final object for war. That gives us a point on which must converge all our energies of mind and body.

The beginning of all war ever since the dawn of history is the struggle to hold in one's possession the power of manœuvre. The power of manœuvre is the great means by which we bring about at the place of our choosing—and at the time of our choosing—the final land battle, the victorious land battle.

The power of manœuvre is the ability to move fighting strength to the place at which a decision can be got and a victory gained.

Thus we have our problem in general terms clearly before us: it is, to produce our power of manœuvre to such an extent of superiority over that of our enemy that he can in no way interfere with our bringing this great fighting strength to the final land battle and there deciding the war in our favour. This entails not only our producing our own power of manœuvre but also strangling our enemy's power of manœuvre until ours is absolute. We will now see this process at work in the recent campaign across the Pacific.

In 1941, Japan, with absolute ability to move fighting strength wherever she wished, broke out from her home base and launched her fighting forces by sea, air and land just as she pleased, to her conquest on the perimeter of South-East Asia. She attacked the American fleet not only to nullify its strength as a battle fleet, but also to prevent it from acting as escort to move the fighting strength of America across the sea. With that naval power lost, with the destruction of the small British air force, and impeded by the grave mistake made in the laying out of our Malayan theatre of war, the Allied power of manœuvre was almost negligible and Japan was able to do what she wished, where she wished. That, mercifully, is a situation in which *we* at last found ourselves.

She had produced to the maximum her power of manœuvre and she had strangled that of the Allied Nations. But the wheel of war went full circle. Launched with less fighting strength and less ability to move it than were necessary to hold her conquests, Japan was in turn to find herself in the sorry position of slowly seeing that power of manœuvre whittled down by the air forces of the U.S.A. and the Commonwealth. Up to the point of one's administrative capacity, it is easier to keep going an offensive campaign than it is, at the limit of one's administrative capacity, to hold off an enemy over a great area, because fighting strength can be economised by concentrating it in its successive thrusts. Unless one's means of mobility are far superior to those of the enemy, one can never oppose in good time a sufficient force against an enemy's main thrust.

The war sprang back, with the United Nations' air forces carrying forward the United Nations' fleets and seaborne armies and preventing in each case the Japanese air and sea transport from bringing fighting strength where it was so badly needed. In May, 1942, was fought the battle of the Coral Sea, followed by the naval victory near Midway Island : this was followed in August by a landing on Guadalcanal with the destruction of a large Japanese convoy sent to reinforce that island. By February, 1943, Guadalcanal was firmly in our hands and a base for further operations was being

created. Landings on the Marshall and Gilbert Islands succeeded. In mid-June, 1944, the Americans were attacking Saipan, 1,500 miles from Japan, there to install their heaviest bombers.

The process went on, the ability to move fighting strength by sea and air being whittled away and fighting strength itself being weakened by wastage, until we obtained a footing in an area which was sufficiently close to the Japanese homeland for us to destroy his fighting strength at its source, from the Island of Okinawa. The capacity to move fighting strength within the Japanese Islands was attacked by bombers on railways and by mines on coastal sea-lanes.

All this great preparation was designed for one purpose only; for the final land battle on the Japanese homeland with armies brought in by air and by sea. In the event, the nuclear bomb decided the Japanese not to await the launching of the land attack.

Looking at this great campaign, one notices how the American forces passed by the forces of Japan garrisoning the various islands. They could not have done this if these forces had been possessed of the ability to strike back directly or to cut their communications. The Americans destroyed that ability by putting out of action the enemy's air forces, his troop-carrying vessels, his cargo vessels and his escorting fleets. In the same way, throughout the centuries in the past, field armies could not safely pass by city fortresses which held effective counter-offensive troops. Those places have to be invested. If one glances at the sketch "The Battle of Tobruk, Rommel, 1941", p. 22) one notes that matters are the same even today.

So we find what we may call the armies of manœuvre passing between the neutralised fortresses and establishing their own fortresses in such places as Leyte, Saipan and Okinawa. The pattern is oddly similar to the pattern of war that we have always seen. That is to say, there were fortresses on these different islands; the great army of manœuvre in the shape of fleets and trooped land forces; the siege trains in the shape of the heavy bombers; the heavy

naval guns and the armoured assault forces of the land armies. The method of siege, by the very nature of the element over which it was mainly fought, was a blockade of the sea entrances to these island fortresses. Allowing, therefore, for the new arms of our time, we may well say that the pattern of that great campaign was the pattern of the smaller campaigns of Marlborough. The war was fought over an area, not by producing one line against another as the battles of 1914-18. This is, no doubt, a very obvious remark to any military reader but it is important to our subject.

In this Pacific war, we see the process of the rise and fall, the production and destruction of the power of manœuvre. Every army since history first began has striven to produce its power of manœuvre and then to maintain and improve it: if it has not got this power, then it strives to obtain it; and all the time it devotes itself equally to the lessening of the enemy's power of manœuvre—of *his* fighting strength and of *his* ability to move it.

So the history of war is really the history of the power of manœuvre, and the history of the power of manœuvre must obviously be the history of the arm of manœuvre. That arm of manœuvre has, up to a short time ago, always been the cavalry. Therefore, the history of war has always been the history of cavalry. So now let us go back to the history of cavalry in order to discover what the pattern of war has been through the ages.

We will start with Alexander the Great, for, so far as I have been able to ascertain, there was before him no commander who had fully organised and fully integrated into his battle the arm of manœuvre, the cavalry. At Marathon, for instance, we read of two great pedestrian armies striving for mastery, but there is little that we ever hear before Alexander's time of a properly organised and tactically trained cavalry arm.

Philip of Macedon handed on to Alexander a magnificent fighting machine, in which a considerable part was played by this new mounted arm, some of whom were mounted archers. The quality of this army was recognised at the time, for Clitus, one of Alexander's generals, bluntly told the King

that his victories were due to the veteran army that Philip had handed on to him. For his frankness the passionate and homicidal coxcomb, Alexander, promptly murdered him. To Alexander, Philip was the organiser of victory as was Carnot to Napoleon, two thousand years later. With this fine instrument Alexander broke into Asia Minor, passed through it into Persia and India and swept south into Egypt, there to dedicate himself and to consult the Oracle of Ammon in the Siwa oasis, a romantic enough spot for any great commander to bring his arms to. It was at the battles of Gaugamela and the Hydaspes that Alexander so brilliantly proved his cavalry arm. At Gaugamela it smashed into the flank of Darius's infantry of the left centre and drove it from the field in complete rout. At the Hydaspes the cavalry, opening the battle with mounted bowmen, first destroyed the opposing horse and then, supported by infantry, defeated the elephants and infantry of Porus.

We now pass forward one hundred years, to 200 B.C. One-eyed Hannibal, the great Carthaginian soldier, was in Italy, fighting a war of manœuvre in which, at Trebbia ¹ and at Cannæ he confirmed the ascendancy of the arm of manœuvre. One notes that because he failed to attack Rome itself, that great fortress of his day, he failed to achieve victory over the Romans and in the end was worn out and obliged to retire. While it is true that Carthage starved him of reinforcements, it is also believed that he possessed no siege train suitable for the task of reducing Rome. It was a war of armies of manœuvre and assaults on city fortresses, the classical form of war fought over an area. It was one other proof that there is a traditional pattern of war. Here are the conditions, and there are only three of them, which determine the nature of war that may be fought. They show whether the war will be a war of manœuvre in the classic form or whether it will be a static war in the abnormal form of France in 1914-18.

¹ At this battle the cavalry in Sempronius's Roman army was less than one tenth of the whole army: Hannibal's cavalry was one quarter of his army. With that cavalry he first routed the Roman horse and then turned on the infantry.

First condition. Flanks shall be tactically open or it shall be possible to create a flank by a break-in and break-through.

Secondly, the mobile arm shall be predominant (and in the mobile arm is included the mobile arm of bombardment and air landing, the air force).

Thirdly, that it shall be possible to administer the mobile arm to the point at which it will decide the battle and gain decisive victory.

If one keeps one's eye on these three conditions, is well versed in the science of war, and in close touch with the research and development of weapons and potentials of war within one's own country and outside of it, then one can from time to time determine how a war shall be fought. If all these three conditions are absolute, then we shall get a war of manœuvre in its most extreme form, such as in the days of Jenghiz Khan of whom I shall later speak. If none of these three conditions is favourable, then we get the most unusual form of war, the linear war of 1914-18. As the degree of strength of each of the three conditions rises and falls, so does one get wars which are of a pattern varying between the two extremes. It is, however, remarkable how little the pattern really departs from the war of areas in which we have the fortress bases, the field armies of manœuvre, the investments of the fortresses, the assaults upon them and the use of the great siege trains.

I do stress this last, the siege train, for it is a component part of every army and it has unfortunately been left out of our armies as a definite, fixed and fully developed component for about a hundred years. There are reasons for this neglect and in due course I shall speak of them.

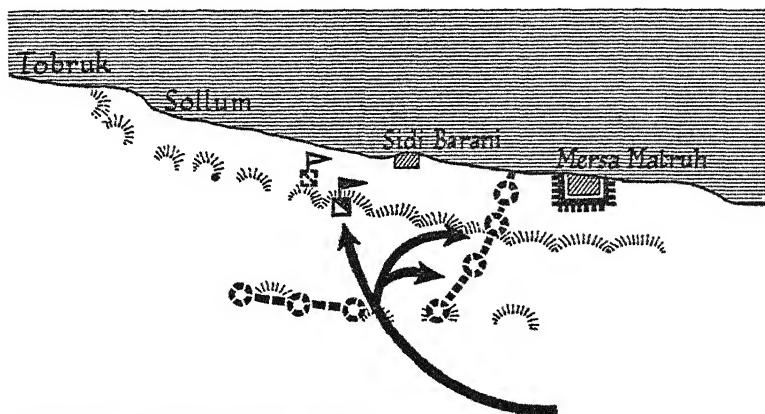
We will continue our discussion on the rise and fall of the arm of manœuvre. In 53 B.C. the Roman general Crassus moved into the northern plains of Iraq. His army was the usual well-trained army of the Roman Republic. It consisted of Roman legions and of the ordinary Roman cavalry, a rather heavy form of cavalry, perhaps more useful in the enclosed country of Europe and Asia Minor than in the more open countries of the east. Crassus passed his army through the town of Carrhæ with his cavalry leading. The army came

clear of the town and into the desert beyond, when the Parthian cavalry made its appearance. This was a highly mobile cavalry, mainly composed of mounted archers whose tactics were to avoid the physical shock and to use the shock of fire, in the same manner as do our tanks of today.

Here, I should note that it is always necessary to watch very carefully in our armies the swing between the actual physical shock or contact of the mobile arms and the conditions which lead to the use of the fire shock. In Northern Africa it was failure on our part to understand that at that time the fire shock was the order of the day, that led our armoured commanders into tactical blunders. Instead of using the cunning and stratagem of the Hannibal, Belisarius or Cesare Borgia type, and obtaining the best surprise fire positions, they rushed headlong on to the pikes, the heavier guns, of the well-positioned and stationary German armour.

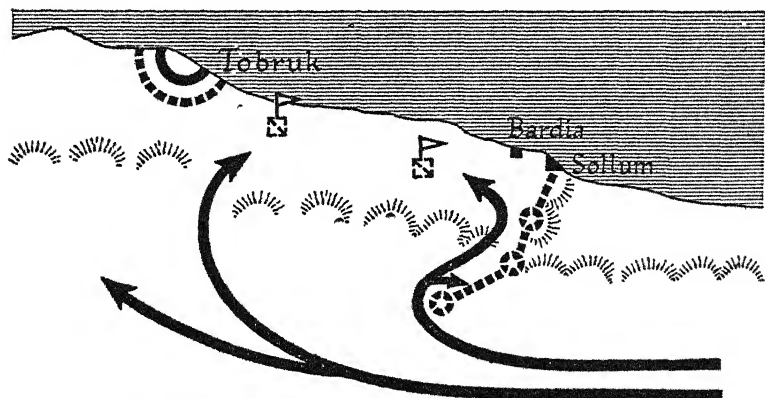
To return to Carrhæ. The Parthian cavalry drew back until they could safely surround the Roman cavalry without interference from its infantry. They then set to work to close in on it and to shoot it to pieces with the arrow. The Roman cavalry was destroyed. Deprived of his arm of manœuvre, Crassus had the good sense to draw back upon the town of Carrhæ, the anti-tank obstacle which would check the onslaught of the Parthian tank-like horsemen.

Here he stayed, though he soon found that for one reason or another he must quit the place and move for home. He emerged out of Carrhæ in retreat. When he had got well clear of the town, the Parthian cavalry surrounded his infantry, besieged it on the battlefield, and there destroyed it. Once surrounded, the pedestrian army was doomed, for it lacked water and the food that could keep it alive. To be besieged on the battlefield is the final act of disaster for any army. It happened fairly frequently in the recent war. Refer to the two maps over-leaf; first to "Graziani at Sidi Barani" and note how the Parthian cavalry in the shape of the completely mounted 4th Indian Division and 7th Armoured Division broke through the linear infantry defences of Crassus near Sidi Barani, besieged the infantry on the battlefield and



Axis forces shown by broken lines

Graziani at Sidi Barani



The Battle of Tobruk

Axis forces shown by broken lines

The Battle of Tobruk, Rommel, Nov.-Dec., 1941

assaulted and destroyed it. Again, look at the map of Tobruk, 1941. Rommel had put out in the desert southwards from Sollum a linear field position and that position was turned by the wholly mounted British army. The war-cry and tactical policy of this battle was that every arm and every weapon at all times was to be devoted to the destruction of the German arm of manœuvre and all that fed it. In spite of avoidable errors in the early part of the battle which made more difficult the task of bringing the enemy's armour quickly into the fight at our advantage, it was this tactical policy that won us the battle.

Why? The reason is that once the cavalry of Crassus is destroyed then the infantry cannot remain in the field, for it will be besieged on the battlefield. Its only hope is to get back to the fortress of Carrhæ at Tobruk—or even perhaps somewhat east of Tobruk, with Tobruk as the main fortress area—the whole position munitioned for as long as it is necessary for it to hold without relief, so that the infantry of Crassus need not again move westwards into the open from Tobruk.

Rommel's arm of manœuvre was finally destroyed, siege was laid to his field positions running south from Sollum and in due course they fell. They did, indeed, impose some delay upon us and were something of a handicap. The northernmost positions about Bardia and Sollum were to some extent munitioned, and to some extent in the nature of fortresses. They serve all the more to prove my contention. The Parthian British army moved westwards and would have laid counter-siege to Rommel's army of investment about Tobruk. Tobruk was held by us and neither his infantry about Sollum nor his investing army about Tobruk could find refuge and re-supply in that place. He raised the siege and tried to get his infantry away to the west, but our mobile arm very quickly accounted for it in the open.

Thus, on the Western Desert in 1941, was re-fought the battle of Carrhæ. It was fought before then at Sidi Barani (see opposite page) where Graziani had made the error of organising only a small armoured force, while dispersing these mobile weapons among his infantry positions. The arm of manœuvre

was wiped out by our better arm, and the inevitable happened to his infantry on the battlefield.

Here, then, from these three battles, one can derive a definite rule of war which certainly obtains whenever the traditional form of the war of areas is the order of the day. As it is most unusual that it should not be the order of the day, then this rule can be held to be an eternal rule of battle. I shall prove it more than once as I follow through this story.

The rule is that no army that is weaker in the mobile arm can hold a linear field defensive position which has an open flank or which can be penetrated. Rules are made to be broken and there are exceptions to rules, but that does not make those rules any less durable. There are rules of war which apply whenever the traditional pattern of war is being fought and it is high time we put our heads together and compiled these rules. It should be observed that in about 500 B.C. the famous Chinese Marshal Sun Tzu produced a book ¹ which has been called the *Principles of War*. They are not really principles: they are the precepts of war as he knew it in his day, but you will see that many of those precepts are precepts which eternally apply to the war of manœuvre.

None the less are there rules which can be applied to this pattern of war in our day, as well as rules that can be applied for all time.

For lack of such rules we have made some sorry battlefield mistakes and the breaking of this one particular rule was the cause of disaster in the majority of the battles of the late war.

In these desert battles we have the same pattern of war in general, fortresses, armies of manœuvre, etc. as we have all through the ages.

Let us go on with our history. We pass through the period of the Byzantine Empire of Eastern Rome and we note how Belisarius in the 5th century A.D. fought with his infantry and cavalry in the classic form of war. We note, too, how Valens, at Adrianople in the 4th century A.D., had his infantry army destroyed by the Gothic cavalry.

A short glance is needed at the Crusades. In 1097 the first

¹ Translated by Wing-Commander Machell-Cox.

great pilgrimage of knights, foot-soldiers, followers, women and children crossed the Bosphorus into Asia Minor, when Alexius was Emperor of Byzantium. It was a migrating horde rather than any sort of organised army, but, despite its lack of organisation and its feudal structure it was a great fighting army.

In the Galilean hills on the fourth of July, 1187, the Christian host was destroyed by Saladin on the battlefield of Hattin. It was destroyed because, in 1098, their forefathers had neglected to turn eastwards in their drive on Jerusalem from the north and so had never reduced and occupied and held the strategic fortress of Damascus, standing as it does in its well-watered plain at the foot of the Syrian hills on the edge of the desert, in command of the desert routes and the way from Egypt to Northern Iraq. Based on this place the Muslim power restored itself after its early defeats, and back it came with the full force derived from its strategic fortress, after nigh on a century, to the battlefield of Hattin.

With ever-dwindling numbers, due to repatriation and release, with shortage of reinforcement so familiar to us today, the Crusaders would long before have been thrown out of the wide coastal strip they had conquered had they not sowed the country, from the Holy Land as far north as Latakia, with a brilliantly devised system of castle-fortresses from which and between which they operated their army of manœuvre, concentrating and dispersing as needed. No better example than this can be found in history of the proper use of, and of the strength that can be derived from, a good system of fortresses. From now onwards these Syrian castles became the pattern from which the mediæval defences of Europe were designed.

After crossing the Bosphorus the First Crusaders laid siege to Nicæa and took it. They advanced south, 300,000 strong, in two columns making for the high salt plateau of Asia Minor. As they approached it the northern or left column of Franks pushed out too far and, at Dorylæum, were set upon by a cloud of Turkish horsemen armed with bows. Thrown back on their wagon train and in confusion, they implored aid from the right column and in the very nick of time it

came. Godfrey of Bouillon rode up and formed his battle on the Turkish flank ; charged home in strength and swept with his heavy mailed men the whole enemy force in rout from the battlefield. From then onwards the Christian heavy cavalry asserted their position over the lighter horse of the enemy. It happened again outside the walls of beleaguered Antioch. With some humility, we later look upon the victories of Jenghiz Khan over the western armies ; this Christian ascendancy prepares one to read the worst of the dark days of the 13th century.

Had the Crusaders taken Damascus, thereby gaining strength and depriving their enemy of the sinews of battle, the disaster of Hattin would not have occurred and the whole history of the world would today be different. Islam would have been confined to its eastern deserts and its poverty and sparse population. It is a matter of serious consequence to fail to take a fortress that can be taken, or to give up a fortress that is held, when that place is a place of strategic value. From what we can discover, it seems that the three-cornered jealousies of the Emperor Alexius, the Count Bohemond, and Raymond of Toulouse kept their fingers off the rich prize of this city, for each feared that the other would seek to possess himself of it. It was a costly mistrust.

Those were days of traditional warfare with cavalry in absolute predominance.

We pass on to the great days of Jenghiz Khan about A.D. 1200. This, the greatest master-butcher of all time, is in my opinion the most consummate land soldier that the world has ever known. His beginnings were in the Mongolian marshes where he hid as a boy of fourteen, encumbered by a block of wood placed by his enemies about his neck. He escaped, regained his khanate and in a few years had for the first time consolidated the great nomad power of Mongolia. Yearly he gathered his horde upon the Onon River in their sombre blanket tents, and yearly he summoned his Orlok and spoke to his great captains, to Sabutai, Jebei, Juji, Jagatai and Ogatai, of the campaigns yet to fight and of the holding of the countries they had won.

This magnificent warrior threw out his armies of mounted archers far to eastward and to westward. The mobile arm was utterly predominant. He could administer that arm to the point at which a final decision could be got. This he did by mounting each man with three spare horses. The one he rode, the second was a mare from which he drew his kumis, the mare's milk, and the third and fourth were his spare chargers which, when driven by hunger, he ate. The administrative train was cut to the limit, and the power of manœuvre raised to its highest with a completely mobile mounted fighting army.

Turning eastwards, Jenghiz launched himself upon the Kin Empire of China and there he destroyed the Kin infantry on the battlefield with his mounted archers, but the great fortresses of Yen-King and Ta-tun-fu defied him. At first he was without a siege train. He retired beyond the Great Wall and there practised the art of siege. His siege train came into full use, and time and again he found himself committed to frequent and costly assaults upon the fortresses of the Kin Empire. Thus we see the traditional form of war being forced upon Jenghiz Khan, little as he willed it. He swept westwards over plains and mountains, and conquered deep into the Balkans to the Adriatic, and north-westwards to the gates of Novgorod.

As he drove south-westwards into the settled countries of the Khwarizmian Empire he stumbled up against their fortress cities. At first, having defeated their armies in the field, he lightheartedly passed between these fortresses and left them behind him. This was nearly his undoing, for the remnants of the defeated armies took refuge in the fortresses and there organised and re-supplied and gathered together until they were again an efficient fighting body. They then took the field in his rear and threatened to bring about his ruin. Much against his leanings, but remembering the lesson he had learnt from his failure to capture the Kin fortress of Yen-King, Jenghiz Khan had accepted his son Ogatai's newly organised siege train, the one impediment which could hinder his mobility. At the siege of Nishapur the artillery park

contained 3,000 machines casting heavy incendiary arrows, 300 catapults, 700 mangonels to throw burning naphtha, 4,000 storming ladders and 2,500 sacks of earth for filling the moat. But as a whole it raised his power of manœuvre, for it brought to him a fighting strength that was necessary in order to clear the way for his advance, to clear his communications and render him safe.

At his death this great soldier had overrun Asia and Europe from the Sea of Japan to the Adriatic and almost to the Baltic. Much as one hates his cruelty, one can but admire his amazing skill both in preparing for his campaigns by the insertion of the now commonly known Fifth Column, as well as the actual conduct, both strategical and tactical, of his operations and those of his Orlok, often against almost insurmountable difficulties of mountain fighting with a mobile force.

Just as Rembrandt has done almost everything that is known today of etching, just as Aristotle said two thousand years ago almost all that was then to be said of philosophy, so does it seem that Jenghiz Khan has shown us almost all that there is to be shown of land fighting.

It is only distantly related to my subject to ask whether it is Russia, full of Tatar blood, which inherits the tradition and empire of Jenghiz Khan, or whether it is China, ruled by the great Khakan Kublai, which inherits the tradition and dominion of its Mongol Emperor. Is it Russia that is to pride herself on the achievements of the lame chieftain of the Green City, Timur Aqa, liege of the Golden Horde, the core and heart of Jagatai's fief held under the overlordship of Jenghiz Khan? Was Yermak the Cossack Hetman the spiritual descendant of the Tatars, perhaps even their lineal descendant, who in 1582 rode north-eastwards with only eight hundred men across the open spaces of Russia right into the vast depths of Siberia? Why, indeed, did the Mongol tribes of Siberia so readily submit to Yermak's empire? Perhaps these are the complex threads of Euro-asiatic policies of today.

The three conditions that make for the area war of manœuvre were in the absolute transcendent in the days of Jenghiz Khan.

In Europe the nations were passing through feudal times where each lord and baron fortified himself in a great castle with a deep moat, the impassable obstacle, and wherein he kept his forces of manœuvre ready to take the field based on the fortress. His castle besieged, his defeated forces gathered into its courtyard ready to make the sally, at an opportune time, as did the garrison of Tobruk, in 1941. Outside, if he had friends, fresh forces were collecting to attack the besiegers as did the mounted army of the British to raise the siege of Tobruk in December, 1941. In England the forethought of her kings to some extent prevented the nobles from making themselves independent in their castles. For this reason, later on, it was not the castles against which the Roundheads and Royalists spent their strength so much as the manor houses—such places as Basing, Compton Winyates, Chipping Campden—and the towns.

The fully organised fortress, with its stables for a considerable army, can be seen at the Kerak des Chevaliers, in Syria, whence Crusaders controlled and raided the country out towards Baalbek and fateful Damascus.

In Cyprus, too, where the wine has been over-strong since before the days of Richard Cœur de Lion, there stood the ancient fortresses, such as St. Hilarion and Buffavento, that formed the last refuge of defence in the island.

The bowman and the armoured man were learning to work together and to value each other's characteristics. At Falkirk, for instance, in 1298 Edward I's bowmen bombarded Wallace's "schiltrons" in order to prepare for the armoured charge that won the day.

And now we pass to 1365 to the battle of Poitiers.

IV

THE DECLINE OF THE POWER OF MANŒUVRE

POITIERS marked the beginning of the decline of the cavalry arm. It is true that from time to time cavalry regained its power of manœuvre and, in fact, became predominant on the battlefield in many periods yet to come, but the fact remains that the English archers, directed by the Earl of Oxford, armed with their cloth-yard bow and concealed by a hedge or protected by marshy ground, shot to pieces the pick of the French mounted men. The horseman had armoured himself very heavily, and the great weight had borne down his mount and rendered it slow and immobile while not at the same time providing full protection against the English arrow. He and his charger provided a slow-moving and easily-struck target. Arrows clattered off shield and armour but penetrated the hindquarters of the horses. The cloth-yard bow, manned by expert English marksmen,¹ was a comparatively long-range and rapid-firing weapon. The chivalry of France went down before it. The Dauphin dismounted his men-at-arms and launched them as infantry with little result.

In the 15th century it became usual in England for the heavily-armoured knight to ride his horse to a place near the scene of battle and then to take part in the battle dismounted. After the battle of Barnet, in 1471, the Earl of Warwick was caught and killed while on foot making his way to the horse that he had left at Wrotham Park. The young Edward IV had done nobly on foot in the forefront of his army. "This battayle duryd fightynge and skirmishing right doubtfully . . . by the space of three hours. . . ."

At this point we find the pedestrian arm of fire obtaining

¹ Philippe de Commines in the 15th century termed them "the best shots in the world".

the ascendant over the arm of manœuvre. The strategical pattern of war did not change very much, owing to the fact that the first condition, the open flank, still obtained tactically, therefore linear war could not develop although the other two conditions had lost their dominance. Strategically, with the fortress towns continuing to be of some importance, although the war of manœuvre was slowing down considerably owing to the footman with his slow march pace being the dominant arm, there were, as is customary in the classical war, no strategical flanks recognised by the contestants. War was still fought between the cities by the armies of manœuvre.

From Poitiers we pass forward to the days of the lame chieftain from the Green City by Samarkand, the brutal warrior Timur Aqa. This captain started as a wanderer but bit by bit he built up an army and became a great conquerer. His forces were on the traditional Mongol pattern, mainly of mounted bowmen. He, too, found that despite his great mobility he was forced to enter upon many a siege. One example of many, of the manner in which Timur was compelled to assail these cities, comes in his Syrian campaign when he was forced, in order to clear his right flank before his southward advance, to turn aside, invest and capture Sivas, the strongest of the Osmanli frontier fortresses, and also Malatia. He could not afford to leave them as a base and sally port for his enemy against his communications. In fact, so used was he to the besieging and assault of fortress cities that he devised a definite procedure in siege conduct. He would raise upon the ground a coloured banner to indicate to the garrison and to its citizens the urgency of his demand for surrender, and warn them of the destruction that he would wreak if his demand was refused. Finally, he would raise the black horse-hair banner to tell the doomed city that he was bent upon its obliteration, and the massacre and ravishment of the inhabitants. In this manner, with his battles of manœuvre and his great sieges, he passed westwards to destroy the Bayazid Empire of Turkey, northwards to rout the Boyers of Russia. He hunted Toktamish, lord of the Golden Horde, far into the snows, following the burnt-out camp fires of his

invisible enemy. He pressed his pursuit until at last his quarry turned at bay, only to be utterly destroyed by his horde of mounted bowmen. Here, then, we are getting the three conditions which make for the great war of manœuvre, with its fortress bases and the cavalry arm in the absolute ascendant except for short periods of siege fighting.

Timur Aqa, spiritually descended from Jenghiz Khan, seems to be the originator of a military tradition of conquest which may belong to both the Tatar Emperor of China, Kublai Khan, and to the Tatars of South Russia. One wonders which side claims the inheritance, bearing in mind that Sun Yat Sen in his lectures to students of China lays claim to the conquests of Kublai Khan in South-eastern Asia and Tibet and, of course, lays claim to the possessions of the Manchus in Manchuria. How far that same spirit of right by conquest attracts the Chinese mind through the wide passage of the plains of Mongolia into Greater Russia is a matter of conjecture.

In the same 15th century that saw Timur Aqa confirm in the East the absolute predominance of the mobile arm and produce the high-speed war of manœuvre, Charles VIII of France destroyed in Italy the power of the ducal cavalry. In 1494 he entered North Italy from France with an army that was largely composed of infantry arquebusiers and with a train of some two hundred mobile cannon of all sorts, thirty-odd being heavy brass pieces. Along with this, but only as an ancillary, he brought a mounted arm. Whether by moral or material superiority it does not matter, but the fact remains that this pedestrian force of fire time and again drove from the battlefield the mounted men of Italy. He marched south into the Neapolitan land and took possession. The next year he turned north again, on his way back to France, and was severely handled at the battle of Fornovo. However, he had shown the quality of the infantry arm of his time in the days when the Borgia Alexander VI ruled the Papacy, with his son as Captain-General. It was a pity that that commander had no part in the campaign of Charles VIII's invasion, for he had a pretty flair for the tactics of the battle-

field, as well as a low cunning which well fitted the stock from which he came.

Throughout the late Middle Ages the explosive weapon was slowly developing and was excluding the bow from the battlefield. Gustavus Adolphus of Sweden set to work on the task of speeding up the rate of fire of the infantry arm, with the object of making it sufficiently independent to withstand the shock of an enemy cavalry without calling upon its own arm of manœuvre to rescue it from destruction. At the battle of Gazala, in 1942, we saw the infantry in such a low state of resisting power that in very many cases it was unable to withstand the assault of the enemy armour. Placed out in a field defence as it was, it became a liability to its own arm of manœuvre, whose freedom was fettered by its calls for help. Nearly all aspects of war seem to repeat themselves, and there is an astonishing similarity, even of detail, between battles that have been fought in the past and those of today.

The development of tactics is caused on the material side by the improvement in weapons. Until the advent of Gustavus Adolphus, about 1630, the firearm of the infantry was the musket, a matchlock which was too massive to fire from the shoulder. Bit by bit the weapon was lightened to enable the musketeer to discharge his piece without an artificial rest. This cumbersome weapon forced the infantry to form up in as many as ten ranks. The weight that the infantryman carried slowed his rate of march to about twelve miles a day. An infantry column was a slow, unwieldy mass of human bodies.

The rate of fire was not enough to hold back a really mobile and well-trained cavalry; at the same time the ability of a great block of infantry to manœuvre when formed up in this manner was strictly limited. The drill was that the front rank blew on its match to the point of explosion, fired, and ran to the rear. All nine men stepped forward and the next man fired while the first man, nine ranks behind him, was reloading and priming his musket. By the time nine other men had fired, the first man would have reached the front rank again, ready to fire his second shot; and so the infantry battle went on. It is obvious that if this serried formation were turned about to

meet cavalry attack from the rear, then the man who had just fired and was most unready to accept action would be the man who would face the enemy cavalry attack. It was, indeed, very difficult to turn the formation about. If it were turned to right or left then it had no form of battle-drill for the loading and firing of the musket, and presented the enemy with only one man who was ready to explode his charge and fire his shot. Thus, the formation was one which could only fight and move to its front. On the flanks, and interspersed among the musketeers to protect them, were pikemen, an insufficient protection against a really well-handled cavalry.¹ And so, by dropping the long bow, the pedestrian arm found itself far less manœuvrable, and unable to cover such a wide front owing to its slow rate of fire and its battle-drill. It was therefore with great difficulty able to reach to an anti-cavalry obstacle to protect one or both flanks. It is not to be marvelled at that the cavalry would once more become predominant.

The contribution of Gustavus Adolphus in the 17th century was that by speeding up his loading drill he succeeded in reducing the ranks from ten to six ranks ; on rare occasions, when it was necessary to stretch out to a flank to find an obstacle against the onrush of cavalry, they were even reduced to three ranks. The Swedes also introduced the "salvee", the practice of all six ranks firing in one volley, the men in front kneeling, the next stooping and the rear two ranks standing. So the infantry was now coming up on its mounted tormentor.

Gustavus may well be held to be the saviour of the mounted arm, for it was he who at this time reintroduced mobile shock tactics. Prince Rupert served with the Swedes ; Cromwell was a keen student of Gustavus's methods.

It was Cromwell who brought cavalry into something of its former importance. He lightened the armour and gave the men sabres, in this way providing himself with a really mobile

¹ In the 16th century the proportion of firearms to pikes was 1 to 5 : towards the end of the 17th century it was 5 to 1. During the 17th century the proportion of foot-soldiers to horsemen changed from 1 to 2 to 3 to 1. These latter figures will exemplify the decline of the arm of manœuvre.

weapon of manœuvre and one that, carrying a light contact weapon in the use of which they were well trained, was able to close with the rigid and slow-firing infantry of his enemy. Moreover he asserted the superiority of his mounted men over those of the Royalists by drill and battle discipline which ensured the orderly rally and re-forming after the charge in place of the wild rush and dispersion for loot indulged in by the enemy.

To Cromwell goes the credit, but it was Prince Rupert who at Edgehill, short of pistols for his cavalry, ordered them to abandon the "caracole", the technique of riding in with pistol shot and wheeling away before contact, and to gallop right in stirrup to stirrup, using sabre and shock action to overthrow Essex's horsemen. The innovation worked and became the usual method of English cavalry, to the great advantage of Marlborough at Blenheim. Cromwell only followed the example of Montrose and Rupert, two brilliant soldiers. But if you examine the battles of Cromwell you will find that he usually employed the tactical policy later employed by the British forces against Rommel in December, 1941, when the call went out for the destruction of Rommel's mounted arm by all means that could be brought to bear. Cromwell rode firstly for the enemy's mounted men at Dunbar. Having driven them from the battlefield, their infantry was at his mercy. Without the means to stand for a long period against his mounted men they were swiftly destroyed. "The best of the enemy's horse being broken through and through in less than an hour's dispute, their whole Army being put into confusion, it became a total rout; our men having the chase and execution of them near eight miles. . . . You have the prospect of one of the most signal mercies God hath done for England."

At Marston Moor Cromwell's infantry was in process of being beaten by the Royalist infantry when the Parliamentary cavalry, having disposed of the cavalry of Rupert, turned upon the Royalist infantry and destroyed them. At Naseby, he first swept Langdale off the field, then the King's reserve, which fled before him. Having dealt with the Royalist arm of

manœuvre he set to work on their infantry, while Rupert's horsemen were scattered all over the country after defeating Ireton. In the same manner the infantry of Crassus was wiped out in 53 B.C. and Graziani's foot-soldiers were destroyed on the Western Desert in 1940. In the same manner the Tangut infantry was wiped out by Jenghiz after the annihilation of their cavalry on the icefield of the frozen Yellow River.

It is very natural that a civil war should take a complicated form ; our own was no exception. There are always pockets of partisans of one side interspersed between those of the other. In Cromwell's day the city-fortresses, even the country house strong-points, were interspersed among each other, while armies roamed the country based on their own particular fortresses with no strategic flank. So the pattern of war was precisely that of traditional warfare.

As an example ; in the fighting of 1643-44 London was in Cromwell's hands, Oxford in Charles's, Newark and Lincoln in Charles's, Hull in Cromwell's ; Gainsborough on the Trent was captured by Royalists, relieved by Cromwell, captured by Newcastle for Charles, and so on in intricate pattern.

In England regular sieges had been infrequent because the citizens were always anxious to open their gates to baron or King in order to avoid the pain of assault and sacking. But in Cromwell's time the army threw in a nucleus garrison to prevent the citizens from giving in too easily, and strengthened that garrison, if needed, to hold against heavy attack. Hull, York, Oxford, Colchester, all endured the hardships of siege, especially the last, where hunger killed its citizens.

The 18th century confirmed us in the belief that in the more usual circumstances of foreigner versus foreigner the war of manœuvre would rage in the well-known way.

Marlborough succeeded at a time when it seems that the study of war was a common subject of conversation in the drawing-rooms of Western Europe. Tristram Shandy describes how Uncle Toby and Corporal Trim built up Marlborough's fortresses in their garden and even went to the extreme step of thieving Mr. Shandy senior's top boots to represent the cannon. Perhaps it would not have been a bad thing if our drawing-

rooms between 1919 and 1939 had seen fit to discuss the developments of modern war and if it had been regarded with such sympathy that enthusiasts might even turn the lawns into miniature battlefields. We appear to have become a little unbalanced in our values.

In my opinion, Marlborough owes his fame as an organiser of victory on the battlefield to three things. First of all to the battle-drill which enabled him to reduce the ranks of his musketeers from four to three and sometimes to two, thus extending their front, giving them a greater fire shock, and rendering them more manœuvrable. With flintlock and "socket" bayonet¹ on many occasions they became able by themselves to withstand cavalry attack. He could detach them as an advanced guard at Oudenarde, and under Withers decide the day with them at Malplaquet. Next, his administrative arrangements in anticipation of his movements, by which he laid out ahead his depots of supply, gave him the ability to live with ease on the country through which he passed and thereby cut to a minimum his weighty administrative train. Thus, having increased his mobility, he increased immensely his power of manœuvre. Lastly, he developed his cavalry arm in such a manner that it was fully trained to co-operate closely in the infantry battle, even going so far as to inter-space it with the infantry columns in such a manner that infantry and cavalry stepped forward and back in complete co-operation. His cavalry arm followed the tradition of Cromwell, in shock action with the sabre against the pistol-fire action of his enemy's mounted men. When one considers the battle of Blenheim which gave him the final reward of decisive victory, something is found much like the use of the heavy assault tank with the infantry, and like the final devastating blow by the armoured divisions.

His victory at Ramillies is a good example of the pattern of battle of which we are speaking. Having distracted his enemy's attention and reserves to Autreglise, he set about the destruction of his cavalry. Launching his squadrons in succe-

¹ This replaced the old "plug" bayonet which prevented the musketeer from firing when his bayonet was fixed.

sion he engaged the enemy's cavalry while keeping a reserve in his hand for the last blow. The enemy infantry tried to pull out from the battle and was cut to pieces while on the march.

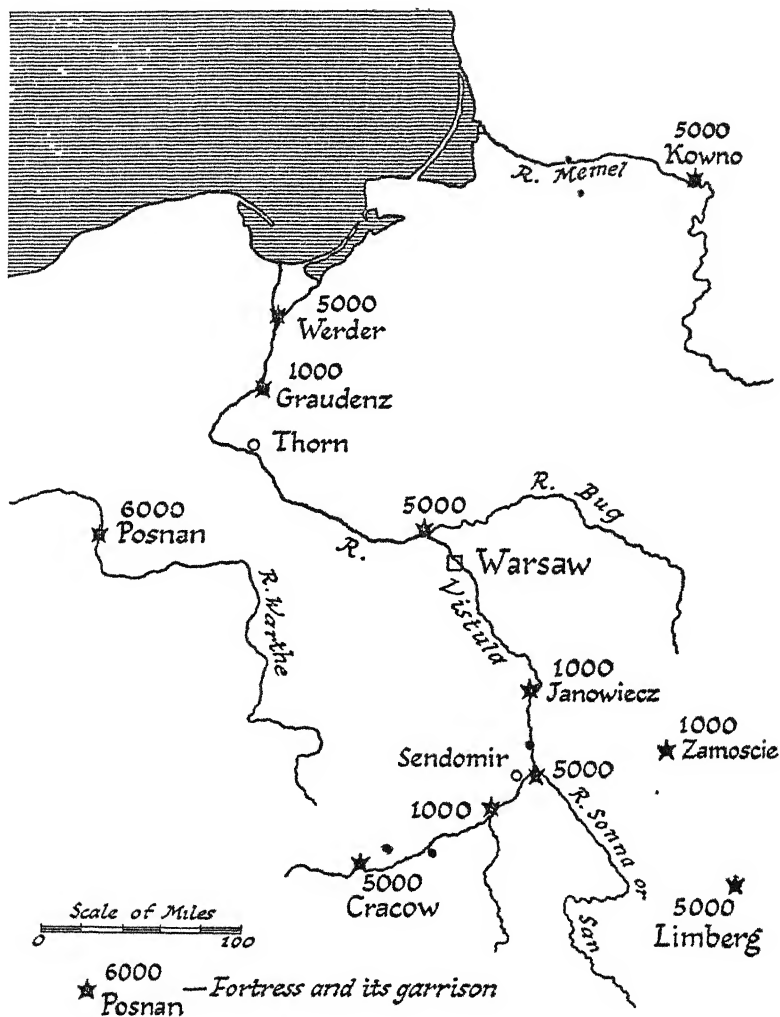
Throughout mediæval times and right into the days of Tudor and Hanoverian kings we follow the same strategical pattern of war, we see a similar thread running consistently through the pattern of battle.

In the 18th century we read of the wars of Turenne and Condé: we note de Broglie's battle drill in twelve columns, Gribeauval's development of artillery by reducing windage and restricting the calibres to three. We read, too, the excellent writings of Bourcet and of du Teil the artilleryman. These take one through the century to the very end, when Napoleon appeared on the scene, won his great early victories and lost his still bigger later battles. In order to understand his early success and his late failure it is only necessary to consult the pages of Marshal Saxe.

We have seen that from 1365 at Poitiers the sun of the cavalry had started to lean towards its horizon. The power of the pedestrian arms was rising. Napoleon continued the process of lowering the power of manœuvre of armies.

In the 18th century Marshal Saxe was the great exponent of area warfare and had planned to hold the whole of Poland against all comers with 50,000 men. By securing and organising the important strategical fortresses, and operating from them and between them his army of manœuvre, he expanded to the greatest possible extent the power of manœuvre of his forces through ease of supply and through closing in his enemy's power of manœuvre by forcing him either to move precariously by bad routes between the great fortresses or by compelling him to waste his fighting strength in laying siege to them.

This great exponent of war maintained that no single commander could operate an army of more than 46,000 men, (ten legions, eight regiments of cavalry, and sixteen of dragoons). His reasons for this are obvious. A commander efficiently controls his armies by means of his communications. In Marshal Saxe's day these communications consisted only of gallopers bearing with them verbal or written orders. It had



Map to illustrate Marshal Saxe's Plan for the holding of Poland

been so when Jenghiz Khan's bandaged "arrow" couriers¹ rode a thousand miles over mountain and desert to bring the news and take the orders of their great leader and his captains. Until the coming of the railway and the line-telegraph things did not improve. An army is limited by its belly; it can only go so far and so fast as its administration will serve it. From time immemorial all land forces had reduced the limitations of their administrative train by living on the country, but there were limits to the number of men and animals which could live upon a given area of territory, and there were limits to the length of time that they could live in this manner. It was not until the railway and, finally, mechanical transport and air-supply appeared on the scene, that administration showed any signs of improvement.

So Marshal Saxe and Napoleon controlled their armies and administered them in a manner which was in no wise different from the general methods of armies that had gone before them. Thus the former maintained that both for purposes of control and for purposes of administration no single army under an independent commander could exceed 46,000 men.

Napoleon started with a great flourish of victory. In the battles of the Montenotte campaign in North Italy he wielded a comparatively small army of 45,000 men, almost without an administrative train, with great speed against his more slowly moving opponent, Würmser.² He gave him a thorough beating. In order to speed his movement and, of course, to live more easily on the country, Napoleon halted his men at night in bivouac positions beside the line of march. His enemy had the old habit of closing his columns on the head for the

¹ The great Mongol general, Sabutai, rode 1,200 miles in a week to take his report on the Khwarizmian situation to Jenghiz Khan. He was bandaged head and trunk for the ride.

² This is the old, old story that has been emphasised throughout the history of war. Leaders who comfortably ensconce themselves in orthodoxy instead of using their brains now and then hit up against the commander who has no traditional manner of fighting and who takes each problem on its merits. The latter wins the battle. A good example is of Essex, who was wrapped in the orthodox ways he had learnt in the Netherlands. At Edgehill he met Prince Rupert, aged twenty-two, who fought with his head. Essex lost a battle. This has been discussed on page 35.

night. It seems to me that the second method of movement was what had been found necessary when an army could only withstand cavalry if it were held together in a great body. It was unable to put out detachments for fear of their being destroyed by cavalry. Napoleon must have realised that his infantry, even in small detachments armed with the flintlock weapon which gave them a great rate of fire, could outmatch the horsemen who came against them. In other words, he had learned the lesson that Marlborough had taught. The English general was the first for a very long time who could trust his infantry to stand detached in comparative safety against the onslaught of the mounted arm. At Oudenarde he employed a detached advanced guard to cover his movements; at Malplaquet he threw out Withers to distract his enemy by operating a detachment away to the flank. So much should Würmser have learned from the English soldier. For failure to learn it gave his young and ruthless opponent a fatal advantage in flexibility and in administrative strength.

In his later battles Napoleon did not show the same originality as he had shown at Montenotte. As time wore on and his power and commitments increased, he found himself at the head of the National Army of the Revolution. Moreover, as the years passed, the coalition against him grew more and more powerful and he was forced to produce an army of greater size than had been known for centuries, fed by conscripting his people. Marshal Saxe's 46,000 men became only a fraction compared with the Grand Army.

Methods of communication and administration did not materially improve, and the French armies became difficult to handle and control. Greater initiative had to be left to subordinate commanders, and only too frequently Napoleon's battles give us a somewhat fragmentary idea of battle movements. Waterloo was the final act of piecemeal attack. These huge armies were becoming less and less able to live on the countryside, especially as that countryside had been devastated by the passage and counter-passage of many armies. With his horse-drawn transport Napoleon was losing his power of manœuvre. His cavalry tended to outdistance its admin-

istration. War was becoming rather more of a slow-motion film than in the past, and as a consequence we read far less of the classical war of areas and far more of the tactical battles of line raging for days on end, without any great forward movement of the opposing armies. The flintlock musket was giving infantry the absolute ability in squares (in other words in tactical localities), to hold against the charge of cavalry. A greater firepower had been developed on far wider fronts than in the 18th century. It was becoming possible to reach out infantry flanks to obstacles that were exceedingly difficult to turn by infantry envelopment.

Wellington's defence at Torres Vedras, with the insurmountable obstacle on each flank, was of course the final answer, albeit on a small scale. Sidney Smith, holding with his ships the sea flank of the Acre fortress, performed much the same duty as was performed by naval forces in the Western European theatre of war in 1914-18. The line's flanks were closed or at any rate not worth the effort to turn, and the arm of manœuvre became in these cases the seaborne fleets.

In Napoleon's time, cavalry had long passed its zenith owing to the administrative handicap occasioned by its horse-drawn train and the devastation of the country in which it operated, as well as by the greater strength and wider fronts of the pedestrian arms.

At last, in 1814, at the great Battle of the Nations at Leipsic, Napoleon's clumsy and ill-trained army met its defeat. He fell back towards France, and in many a counter-offensive with smaller forces almost drove the Allied armies back from his borders, a great contrast to the unimaginative fighting of the campaigns of 1812-14 with far greater armies under his hand.

V

THE ECLIPSE OF THE POWER OF MANŒUVRE

WE now step forward into the 19th century and see the rigid columns of the Prussian army moving to the invasion of France, in 1870. Both in Napoleon's time and again in 1870, the pattern of war is modified from the great war of manœuvre, showing less of the mobility of the arm of manœuvre and less even of the sieges of fortress cities so common in Marlborough's time.

In 1870 the three conditions of which I have spoken are all undergoing a decrease in effect and the face of war is changing with them. The railway has given a considerable mobility, but a mobility which is yet very rigid in its direction: the telephone and telegraph are facilitating the control of considerable armies. Stonewall Jackson has made full use of all these things in the American Civil War, but they are still rather rigid in operation and have given a rigid pattern to the onward sweep of the great armies of Europe.

Napoleon's revolutionary example of the nation in arms was forcing the opponent to place in the field the whole manpower resources of a conscripted nation but the means of communication were still unable to provide such great armies with the power of manœuvre needed for offensive action. In 1870 the sieges of Metz and of Paris were the only notable sieges of the campaign. The great armies moved like slugs over the face of the country, drawing behind them a huge administrative train to supplement the relatively small proportion of supplies which they could procure as they went. These armies were ceasing to rely for their sustenance on the resources of the country through which they had passed. Little by little the idea of living on the country was leaving the military mind. To one who has studied those things that made

the pattern of war through the ages, it is quite clear that a day had to come when an army would again try with some success to shorten its administrative train by living on what it found in its vicinity. The pedestrian arms were coming into predominance with the arrival of the rapid-loading rifle, the automatic weapon and the breech-loading gun, all with a much increased range, and all allowing a wider deployment of infantry in defence.

Now we pass forward to the war of 1914-18, which gave us for a period of four years a pattern that was the exact opposite to the extreme of manœuvre which had been presented to the world by Jenghiz Khan. So far we have sought to find out *why a war of static operation could ever come about*. We know now, from examination of the three conditions which we have isolated, that it was because of the negation of all three of those conditions that the two armies faced each other for nearly four years with hardly a movement forward or backward. The means of transport were still the rigid railways, supplemented by the horse-drawn train; the heavy weapons were still moved about by horses; the most advanced form of signal communication was still the telegraph and telephone line. Beyond the greater firepower of the pedestrian arms and the huge fronts that they occupied, both of which were the logical evolution from the days of Napoleon and his national army, there was nothing that could break the gradual descent from the inspired wars of manœuvre down to the uninspired war of the line. But this state of affairs lasted for only four years out of 2,000 years. It was completely abnormal.

Significant things happened right at the very start of the German invasion of France in 1914.

Firstly, a right wing whose main body was composed of nothing faster than the foot-soldiers outmarched its horse-drawn transport and overreached its administrative limit. We see it slowed down and put out of gear in its planning and operations by this failure of supply. It was too great to live on the country and so to supplement its heavy and lengthy supply train. Almost it was as though one displaced population marched into the country of another people. We see the

rigid system of the railways unable to cope with the needs of that right wing.

Secondly, we hear of the "ride" of one Hentsch, a senior General Staff Officer from Von Moltke's supreme Headquarters, out to the distant right flank. The A.D.C. of Napoleon, the arrow rider of Jenghiz Khan, he was taking despatches and orders from his High Command to Bülow and Kluck, who commanded the northern armies of the German horde. He arrives and passes on his orders, but the situation has changed by the time he arrives. Even the slow onward tread of the infantry, the sluggish reaction of the horse-drawn enemy, have put him out of date in regard to the situation. He gives his orders and there is confusion, hesitation and nearly disaster.

Communication and administrative power are relatively little if any better in 1914 than in the days of Marshal Saxe. They cannot furnish the needs of such immense forces.

The centuries gone by witnessed the building of the Great Wall of China to hold out the raiders from Central Asia, but that wall was never intended to hold out the army of a great modern nation, nor did it ever succeed in doing so.¹ Jenghiz Khan crossed and re-crossed it. Hadrian's Wall across the north of England was also designed to hold out the mountain barbarians who sought to ravage the lands of the more prosperous and cultured Britons; it was not designed to keep out an organised army. If, however, one looks at the Western Front of 1914-18 as only a part of the battlefield of North-west Europe, then one sees that the two arms of manœuvre, the opposing navies, faced each other on the open flank on the north. The decision went in favour of the British fleet but that fleet and that army lacked the power of manœuvre and the great siege train which could drive its way into the frontiers of North-west Germany behind the closed front in France. Perhaps the pattern of land warfare had changed, but the over-all pattern had not altered so much as one might suppose.

¹ The French Lines of Brabant were broken by Marlborough in double quick time in 1705. Villars's "Non plus ultra" field defensive line almost from the Channel to the Meuse was similarly penetrated in 1711.

France, with the British Navy to the north flank, became a fortress which the enemy could neither break into frontally nor take from a flank. *This was a natural evolution of the traditional pattern of war as it is governed by the three conditions we have accepted in this book.*

With all our heavy mobile weapons horse-drawn, with our heavy guns moved on the railways, it was very natural that we were unable to assemble the great siege train which could burst into the enemy fortress at a place where we needed it, or shift it forward to drive the hole to penetration. The siege train dropped out of our vocabulary and it has never fully returned since then.¹ This has been to our great loss, but we have not been the only sufferers, for the Germans in their turn never produced a real siege train for the last war. This is very important, for with the enormous strength of the modern fortress-areas which the world will yet produce and of which I shall speak later, it will be seen that much thought and ingenuity and many resources must be expended in the building of the siege train which will batter into these powerful and colossal fortress-areas of the future.

Towards the end of this uninteresting campaign of 1914-18 in France motor transport and wireless were coming into their own, while the petrol engine drove mobile air forces over and ahead of our armies. All these things, bringing with them the heavy armoured forces of assault administered by cross-country transport, and the long-range artillery bombardment from the air, were enabling us to produce once more those three con-

¹ Leonardo da Vinci writing to Ludovico Sforza Moro, Duke of Lombardy, in the latter half of the 15th century, says: "During the siege of a place I know how to cut off the water in the moats, and how to construct by means of steps all manner of bridges as well as other instruments which are required in such an undertaking."

"If during a siege bombs cannot be used, because of the height of a rampart or the strong fortifications of a place, I have means to destroy every tower or any other fortress, unless it be founded on a rock."

"... I know how to construct subterranean caverns and narrow winding passages. ..."

"... I am able to construct engines throwing stones; slings, battering-rams, and other instruments of marvellous effect and extraordinary kind. ..."

ditions which are essential to the fighting of the war of manœuvre. The lesson learned was forgotten: it was even forgotten that the armoured brigades of Haig's time were at their best when supplied by tracked vehicles. Many of us had not realised that this linear war was a short phase of war, an extreme form which would not recur for centuries. So imbedded in the soldier's mind was the idea that this war was the war of today and of the future that our staff colleges in the 1920s taught this and nothing else. They never looked back to the days before Stonewall Jackson, they never sought inspiration from the wars of the great masters of ancient time, they never sought to find out whether history had for them any good evidence that the war of the line was the war of normal warfare. At the staff colleges and our Imperial Defence College, had they resolutely gone back to the very first principles of war and followed the trend of war through the ages, they would have seen that what they believed was so important in 1914-18 was insignificant in the universal pattern of war.

And so, those men who had had the chance to fight in the few odd theatres of war in which mobility and the power of manœuvre were of some effect, came to our houses of instruction and were given no comfort. They sought for some wise counsel to enable them to solve this big problem which was before them as to the future pattern of war, and far from getting advice they were given an arbitrary decision with the pattern of Western France as that which they should follow. One knew that this diagrammatic and mathematical conception of the battle of lines and waves was for some reason in opposition to all one's experience of fighting, to all that one had ever read of war from ancient times. So one set out to provide one's own theories of war and disprove the theories advocated. Naturally, after contemplation of the campaigns of the past, one concluded that the best volume to study was the latest period in which a true war of manœuvre had been fought. From that period one should work backwards through the centuries in order to see whether at any time that pattern of war had developed into the linear pattern. Very naturally one started this study from the days of Marlborough and found

there what appeared to be a traditional pattern of war. From that point one went backward and then forward again to the linear war. *It was then that the three conditions which governed the pattern of war became apparent.*

I first came on these three conditions of war in 1918, when I was commanding a column fighting through those extensive jungles and hills in Assam where the Japanese invasion of India was brought to an end in 1944. I had been advised by older soldiers to move my column through on a single track in one long snake, with horns covering it like the antennæ of a butterfly at the head of a long worm. My enemy was based on his villages, each village being a stockaded fortress: from these fortresses he launched his mobile light infantry, his arm of manœuvre, and I was in no position to tell from which of these bases he would launch his next force, where he would collect it, and in what strength he would come. It was there that I realised, after nearly being destroyed on my second day out, that the advice I had been given was bad; that there were three conditions which operated always in my enemy's favour and those three conditions were those which I have set out in this book.

A very much bewildered young officer, the night after the battle, I sat in the middle of my column while the men built a stockade for the night about us and there on a piece of paper I wrote down these conditions which were working against me, and devised the manner in which I would operate in order to turn the tables upon the enemy. Three days afterwards I left my small stockade once more, but I left it only after I had made certain that I had sent ahead of me during the night and through the forests, to the points at which he would install his positions to oppose me, parties of troops of equal mobility with the enemy. These forces destroyed him as he came into position and my main body passed through with speed and with ease. On return to base at Imphal, I wrote a paper setting out what I had learnt and asking that we might pursue precisely the same methods as our enemy by stepping forward and building fortified positions in many places between his village fortresses, thus operating our forces of manœuvre in the same

manner as he operated his. With our better weapons we would soon drive him into the forests where he would starve and we could light upon him in whatever strength we wished without his being aware of our coming.

After a great deal of discussion, this course was adopted and the campaign swiftly brought to an end. It was a lesson taught me by some half-naked savages, but I was not, sorry to learn it.

Again, in 1937 I was sent to a particularly bad area on the North-West Frontier of India. I laid out this area in precisely the same manner and within a month my men were right on top of their enemy.

These small successes came from those first experiences which compelled me to a study of war on a wider scale and proved the pattern which I believed by then to be right and that must be constant in the history of war. *The pattern of war that one should be in condition to force upon one's enemy and which he should not be in condition to accept.*

So we pass through the Ice Age of military thought, when it was forbidden that one should write in the civil press about the possibilities of war and the making of war in the future : when military journals refused to accept argument which denied the rightness of fighting a war upon a linear system : when one's files became choked with articles returned because they were so controversial that the editors and most of the readers would not agree with them.

VI

FALLACY OF A LINEAR THEORY OF WAR

WE come now to the war of 1939-45. It cannot be said that our showing at the start of this war was very satisfactory. Unfortunately the "Linear Theory" of the first world war still held the field. In France, for example, the Maginot Line was laid out as a single barrier against German invasion and believed to be impassable. That it was not extended to the sea I do not think was any great disadvantage to ourselves, even had we not launched our left flank forward into Belgium away from the position. The whole position had no depth, in the terms in which one regards depth today. Moreover, this great linear position was not held in place by a considerable and superior arm of manœuvre. A linear defence is not an economical form of defence because a mobile enemy with sufficient power of manœuvre can, in all probability, bring 70 per cent or more of his fighting strength to bear on one small part of the position, whereas only 5 to 10 per cent of the whole positional army will face the blow.¹

The most economical form of defence is a defence of areas, particularly on the strategical plane. By holding areas one need place but a nucleus garrison in those quarters against which an enemy's attack is least expected and can fill up behind the crust of those quarters where it has been finally determined that the enemy will make his main thrust. That is to say, since the Allies had no great army of manœuvre with which to oppose their enemy, they should have faced him on the frontier with their mobile outposts instead of with a complete static linear defence. Behind these mobile outposts should have been the army of manœuvre and it should have been based on well-organised

¹ Marlborough's penetration of the "Non plus ultra" lines is a good example.

and well-stocked areas of fortress defence. Such areas would be about Calais and Dunkirk, Lille, St. Quentin, Abbeville, about Paris, Rouen, Le Havre, Caen, about Lyons and so on. Classic war demands the defence of fortresses by the *levée en masse* of the citizens, thus releasing the army of manœuvre in full for its task. This war raised in Britain the *levée en masse* in the shape of the Home Guard and our other civilian defence services. Between, and among, and from these fortress-areas the army of manœuvre would have swung itself, stopping to re-munition as it thought fit from the different fortresses; at the same time bringing into the fortress-areas the whole produce and the useful supplies of the countryside and the towns and villages outside the areas, thus depriving the invader of the opportunity of living on the country. It is possible that two great fortress-areas strongly held near the frontier, one in the north of France, the other about Metz, Strasbourg, Nancy, would have given the army of manœuvre a sufficient power to prevent by threat, or by ultimate action against the enemy's flank and rear as he passed through, any considerable invasion of French territory.

But, contrary to the principles set forth in this book, a linear defence was laid out on the French frontier and, worse still, the infantry (like that of Crassus) left even these defences and swept out into the open plain on an eastward march. They were caught by the German (Parthian) cavalry of the armoured divisions and finally besieged on the battlefield. Only by a miracle did they escape being completely destroyed. Perhaps our strategy was the result of the ancient lure that the Channel ports and the river estuaries of Belgium had always had for the British maritime power.

There had been much controversy in our papers and journals in England as to the requisite strength of a navy in the face of an unbeaten, shore-based, enemy air force. The controversy had raged over many years, and the navy, backed by a people who had a traditional affection and respect for their ships, managed to hold its end up in the safe days of peace. It was not long before the perilous days of war showed the weakness of the naval argument and the force of argument of

those who backed the air forces in the combat between eagle and fish. Had the air forces won their argument in peace time, then we would have known that in the face of a great air power no considerable invasion could ever be launched from the Channel ports. Had we fully studied the use of air power combined with light craft in the attack on the submarine, we would have known, too, that in this way of waging the underwater campaign we could have made ourselves almost secure from these pirates. By traditional instinct rather than by any rational thought, we placed far too much importance on the value of these harbours and far too much importance on the big vessels to keep open our sea-lanes.

For the last thirty years our navy has been a thing that has been compelled upon us, for it was the thing that many of us believed to be essential for the protection of the merchant ships which brought the vital commodities of war to our shores. This grave weakness, brought about by not being self-sufficient for war, forced upon us the building of an immense navy which in wartime strained our resources to breaking-point. In the future, if we have to fight again, we must somehow find means to enable us to protect our inward and outward traffic with far less effort than we had to put out in the late war. The price of admiralty in World War II has been quite insupportable. It has cost us a vast number of ships of war gone to the bottom, many thousands of dead sailors and, up to May 8, 1945, no less than $11\frac{1}{2}$ million tons of merchant shipping out of a total of $17\frac{1}{2}$ million tons with which the war was started.

Thus it came to pass that our operations in France were marked by little knowledge of the reality of war, no knowledge of the classical pattern which the war of manœuvre must always take. To a student of war in 1918, the writing on the wall was clear when the armoured formation, backed by its cross-country train, was driven forward by air power and shifted across country at a reasonable pace by the support of artillery: the traditional war of manœuvre and of areas was about to return. Throughout the war of 1939-45, in varying degrees as the three conditions were heightened in effect and again lowered, the pattern of war assumed the complete traditional

pattern or varied from it towards a slower campaign with an aspect that some might well term to be linear though it was not, in fact, the linear war as we knew it in 1914-18. That is shown by the great distances covered by both German and Russian armies, in spite of all their handicaps, in the surge forward and back across the flat plains of Russia. The linear pattern of the war in Italy, its slow progress, compared with other theatres, show well the advantage of being able—and always trying—to force the area pattern, the classical pattern of war, on the enemy.

The area defence of France on the strategical plane could be repeated on the tactical level. In the position of Alamein the vital feature was the Ruweisat Ridge. That ridge had to be held at all costs, for its loss would give the enemy observation and a springboard on to the area through which ran the whole communications of the Eighth Army. The defence of this ridge was laid out for a division, but positions were dug to take not far short of two divisions. The actual garrisons that occupied the positions from day to day were less, in total, than two infantry brigades. This meant that more than one infantry brigade resting in some area of the rearward localities was ready directly the main thrust of the enemy's attack was known, to fill up any spare localities behind the brigade which was actually taking the main thrust. There is always difficulty in filling up in this manner, but it is very seldom that it cannot be done quite rapidly at night, if every officer and every man knows how to get from position to position, and if there are proper guide beacons to take them by night between the minefields. This system is given here to illustrate how it is possible to confront one's enemy in the first place with only a nucleus garrison, and to fill up in front of his main thrust until one opposes him with at least a half of the strength which he launches on any given thrust line. *An advantage of two to one on the part of the attacker is not enough to overwhelm the defence when one realises that the counter-offensive force of manœuvre is still there waiting to launch a heavy stroke at the right time.*

With a linear position one cannot operate in this economical manner. In 1939-40 two great industrial nations faced each

other on the French frontier. The industry of these two nations was bound at some time to be able to build up the great forces which would drive a hole and penetrate through the linear defence. In the days when industry was less advanced, as in 1914-18, the industrial nation could not produce the means to break the line. It was obvious that in 1940 this could be done. *Because we attempted to fight a war that was abnormal and against all tradition, France was beaten and the British army in the classical manner found its infantry forces cut off by the enemy's superior mobile army and, as I have said, besieged on the battlefield.*

In Norway in early 1940 we did not make a much better showing. It is well known that the mountain barrier is the most difficult of all land barriers to penetrate (except perhaps the marsh, but extensive marshland areas are not very often encountered). We launched ourselves into Norway but failed to hold the mountain barriers against our enemy. It seems inexplicable today that we could not at least have imposed very great loss and very great delay on the German army moving northwards through Norway. We must, however, admit at once that without sufficient air power it would have been impossible to feed our forces through the harbours of Norway; so in the end we would undoubtedly have lost. Also, we must realise that in those days our ideas and our material were not so far advanced that we could rapidly build the airfields that would have been necessary to the holding in the mountains of Norway of what would have amounted to a fortress-area, covering and supplied by its own harbours. These things were sorely against us, but we should have made a better showing if we had realised what could be done in such a country once we were determined to prevent the enemy's heavier weapons and supply trains moving along the roads into our area of defence.

There are few obstacles more difficult to penetrate than a destroyed road in the mountains. The situation seems to have been much the same in Greece, in 1941, when we were driven from the country as much by allowing the enemy's weapons and road traffic to penetrate our defences as we were by his great air superiority. In either case, if our armies were to

leave the fortress-areas in the mountains and take to the sea, then they were in much the same position as the infantry of Crassus trying to escape from the Parthian cavalry in the desert of Iraq, that cavalry being here represented by air power.

I quote this in order to show how constant throughout the ages is the general aspect of war, and even of battle, and to show that if we will only keep in our minds how simple these aspects are, then we shall avoid committing ourselves to the continual mistakes which are bound to lead to final defeat in any particular theatre of war.

In passing, one cannot avoid remarking how ill-equipped and unsuitably trained were the troops we sent to fight in these mountains. Lack of equipment and lack of training are, I believe, due mainly to the neglect of a wider study of war—which would show us how to conduct and to fit ourselves from top to bottom—and failure far more often results from this than simply from the lack of skill in the use of weapons on the part of our junior leaders. We are not in a position, unless we know of what sort will be the war to be fought, to give guidance that will enable them to train themselves to fight in the right manner.

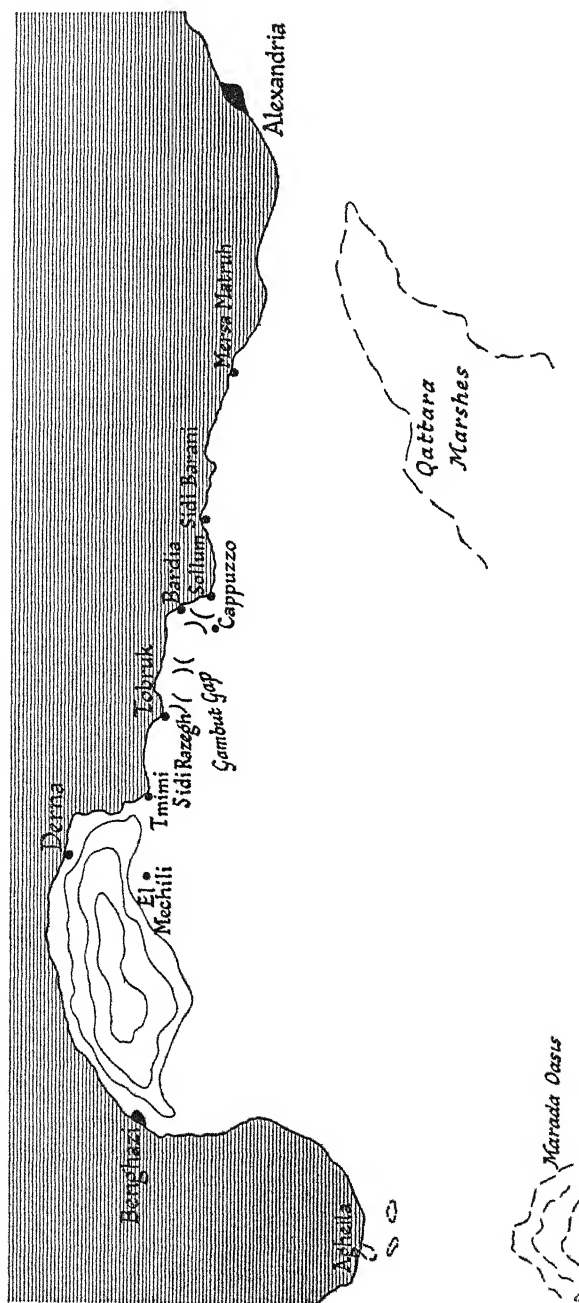
We were not, however, the only ones to make grave mistakes. So clogged was the mind of the Italian Graziani with the things that he had learnt from the war of 1914-18 that he too could only think in terms of a linear defence and that without the deciding weapon of manœuvre. If you look at the map, (p. 22) you will see how he disposed himself in his linear position. I have already mentioned that he dissipated his armoured weapons among infantry positions instead of collecting them as an arm to be used for decisive action. But it is this linear defence which is most conspicuous in the dispositions of his forces. We have seen already how easily he was destroyed by the arm of manœuvre.

VII

THE RETURN OF THE CLASSICAL PATTERN OF WAR— THE GEBEL STAKES

IT is interesting to define what positions were tenable by an army thrown upon the defensive in North Africa. For us, facing westwards and often forced to retire eastwards, there were only these positions. If one is weak in the mobile arm one naturally tries to avoid its being brought to decisive action : in these positions one can avoid this action.

Firstly, with the marshes protecting our front and our southern flank and swinging up almost to our rear, around the little village of Agheila south-west of Benghazi (map opposite). This was a true fortress-area, but rather far from the base at Benghazi which fed it. But it is the handicaps imposed on the enemy which are more important than the advantages we ourselves can claim. Though it was far for us to Benghazi, it was infinitely further for him from Tripoli to Agheila. He was, therefore, coming to the end of his administrative reach and expending great effort on his communications. The causeways were so narrow into the Agheila position that it was not possible to force them against any reasonable defence. To attempt to turn the flank involved a still greater administrative effort in a very long reach around the south, between the position and the Marada Oasis. Unless the enemy were very well provided with motor transport and with repair and recovery facilities for all forms of vehicles, this outflanking movement was impossible. Rommel needed to have been far better provided than he was. As he came to the end of his administrative reach along the south flank of the position, our arm of manoeuvre could have either drawn back closer to its base before him, or from the fortress position have sallied out southwards on to his



The Desert, from Alexandria to Aghaila

flank or cut his communications. So that was a very strong position.

Secondly, there was a good position running from Derna to Mechili and then along the foot of the hills to Tmimi. This, again, was in the nature of a fortress-area, but not so strong as that of Agheila. To a great extent the hills confined the enemy in the northern part to a frontage astride the road. In the south, however, the tanks could roam about the country fairly easily. Whereas Agheila covered the main airfields about Benghazi, while close up to the Agheila fortress itself forward air strips could easily be made, this Derna fortress actually enclosed the main airfields. Not so very far behind it lay more airfields, about Akroma and towards Tobruk. It was well provided with a base at Tobruk, which was much closer to the fortress than was the enemy base at Benghazi, after he had repaired it for use. Thus, administratively, we gained strength over our enemy. I have pointed out that frontal attack on this fortress was not easy in the hills. For the enemy to have tried to cross the desert from Benghazi to the south of the fortress, in order to get in between Tobruk and Tmimi, would have been a very great administrative undertaking. It goes without saying that within a fortress-area must be the munitions, supplies, and water, to enable that area to withstand siege for whatever time is necessary. Otherwise it will become a liability and demand premature relief.

From this fortress-area we could have taken as much or as little of armoured action as we pleased, finally if necessary swinging our armoured force to the Tobruk vicinity where it could most easily re-equip and reorganise.

Thirdly, there is another fortress position from Tobruk along the escarpment to Sollum. As I shall later point out this is the area, rather than the linear position at Gazala, which we should have occupied in the spring of 1942. I believe that had we organised properly we would have destroyed Rommel instead of losing a great battle. This fortress is of the same pattern. It has the harbours of Tobruk, Bardia and Sollum for replenishment. They are all close up under the armpit of the defences. It contains the airfields about

Gambut and along the coastal plain up to Capuzzo, as well as the forward airfields of El Adem and Akroma which one will be ready to give up in the event of very heavy attack. Here again, the arm of manoeuvre can refuse battle with the enemy's superior armour for as long as it pleases.

Fourthly, from east of Bardia to south of Sollum and along the first escarpment near the sea there is a fortress-area but not of very great strength. Its weakness lies in the fact that having taken Tobruk the enemy will find himself at a great administrative advantage over ourselves, fed from Alexandria by road and rail. But if properly organised it could at least compel delay upon the enemy to enable the main force to get back to the great fortress of Alamein. In speaking of the battle of Gazala I discuss the attempt of our forces to impose delay on the enemy about Sollum.

Fifthly, there is the great fortress of Alamein, its northern flank resting on the sea and the southern flank on the Qattara Depression. It is based on the great port of Alexandria, whereas its enemy is based on the distant harbour of Tobruk. Behind it and enclosed within it are the great airfields of the Delta. Here it was possible to refuse battle with the enemy's mobile forces, and that in fact is what we did in August, 1942, when our armoured forces drew back to positions of defence right under the noses of their own infantry positions.

For the enemy, facing eastwards and withdrawing westwards, there were three positions on which he could effectively stop us if he had been beaten in battle.

Firstly, Agheila, using either the marshes to the east or to the west of Agheila, putting us in much the same plight as we would put him facing the other way, but without the advantage of such fine airfields as we would possess, and fighting a good deal farther away from his base at Tripoli than were we from our base at Benghazi.

Secondly, the same fortress-area about Derna, rather more distant from its base at Benghazi than we from ours at Tobruk. Very well supplied with airfields within the fortress.

Thirdly, the fortress of the Sollum-Tobruk area. Tobruk itself was the base from which Rommel could invade Egypt

or we in turn could invade Cirenaica and Tripolitania. With Tobruk as his base he would be better off than were we with Alexandria so far away. Because our garrison at Tobruk held out in 1941 Rommel was kept back and we were enabled to get forward rapidly when we beat him there in December. He would have, in this fortress-area, closer airfields than we would have as we faced him.

In all these cases, holding a well-supplied fortress-area, he would have been able to refuse battle with his weaker armoured force and so have saved it while overstraining ours in our search to annihilate it.

Then, at Alamein. This area was so far distant from his base at Tobruk, and the front he had to hold in order to close the fortress was so great, that it was probably administratively impossible for him to block any serious attack from the east. It was so far from its base at Tobruk, and the country was so short of water that it was impossible for him to have built up the great supply dumps which would have been needed in order to form this into a fortress. So for him, Alamein may be discarded. Its weakness was shown in October-November, 1942, when the northern sector of the linear Axis investing position was penetrated and their weaker armour thus forced to fight a decisive action, firstly in order to hold in place the northern flank of the line and later to gain time to withdraw the German infantry altogether. That the enemy ~~arm~~ of manœuvre could thus be brought to battle and destroyed is the important thing. The fact that it was destroyed towards the end of the battle naturally gave the positional forces more time to escape, and those which possessed motor transport made good use of the opportunity. Whether by any other plan those armoured forces could have been forced to fight and be defeated earlier in the battle is not of importance to my argument. All that matters is that Rommel, in deciding to hold in strength this field defensive position with mainly static forces, was offering his arm of manœuvre—and so his whole army—as a sacrifice to his enemy.

Later on, when discussing the battle of Gazala, I will show

the true value of a fortress in the pattern of traditional war and therefore in the pattern of this war of the desert.

We must now turn for a little from the desert to the mountains. The battle of Keren in Eritrea, in early 1941, was a long-drawn affair in which neither side had the mobility and therefore the power of manœuvre with which effectively to turn the position. The Italian position was based on the dumps just behind it at Keren and it was fed from the bases of Eritrea which were not, comparatively speaking, very far away.

In the mountains, the primary arm of manœuvre is the light infantry. It is therefore essential that that arm of manœuvre shall be given the highest possible mobility and the power to carry its fighting weapons and the whole of its fighting strength to the point at which it can turn a position. In saying this I do not argue that it is not possible to use the tracked weapon of manœuvre in mountains. In the wider field, if one presses along on many routes, there is often one that will in the end yield to armoured pressure. Once that happens and the road opens, then a whole army can be forced forward rapidly through the pass and down on to the plains which are the only objective of mountain fighting, for down there on the plains is everything that supplies the army which opposes one. But in the case of such a position as Keren there should have been no chance of pressing the armoured weapons through on the only route that existed. In the end this was done but only after the enemy had been worn down by incessant battle for many weeks. With an ample supply of porters we could have produced an infantry arm of manœuvre on the flank which would have brought this battle to a close in a short time. The administrative factor, that is the third condition that I have mentioned, is perhaps the most important of all.

In late 1941, as we have noted and as will be seen on page 22, Rommel made the same mistake as Graziani by producing a linear defence in front of us. He thought at the time, if he realised the situation at all, that his arm of manœuvre in the shape of his two armoured divisions—both armed with a better weapon than ours—was a more powerful mobile force

and could therefore keep his forward defence in place against our attack. He had confirmation of this by our failure in the summer operation of that year. But there was a very great drain on the German army and that drain was the siege of Tobruk, in which both infantry and assault armour were taking part.

Rommel, of course, made a grave mistake in disposing his armour, for he placed one whole division and part of another on the north of the escarpment on the coastal plain. This meant that the arm of manœuvre, which, in order to develop its great strength, needed freedom of manœuvre and space for manœuvre, was restricted and lost its characteristic. The escarpment is steep and the armoured force could only be followed by its motor transport train up the escarpment and on to the desert through three gaps: the wide gap at Sidi Razegh and the narrow gaps at Gambut and Bardia. The plan was to throttle his power of manœuvre by corking these three gaps, because in order to use his armoured forces he must uncork the gap, which would have meant a very heavy loss in the attempt. Naturally, if one could break through one gap and cut in half the coastal plain in the rear of his forward armoured division, this would bring on a battle even more to his disadvantage. The battle-cry and tactical policy was to destroy by all possible means his armour, thereby rendering his infantry position useless on the battlefield. Unfortunately, there was delay in driving in the mounted infantry to close the gaps, and Rommel succeeded to a very great extent in bringing his armour on to the desert to fight us at his advantage. However, on the Sidi Razegh gap he lost a very large amount of his armoured weapon, and our infantry took him on with every arm they had, mainly 25-pounders with solid shot. Bit by bit they whittled away the enemy mounted arm until Rommel, who always seemed to have a final weakness in poise and to lose his head, at last gave way and drew back westwards in a considerable rout.

The fortress of Tobruk was not open to him as a refuge for his pedestrian arms. Even had he been able to break into it he would not have found enough supplies there to hold it for

any length of time. Had it been properly stocked and available to him he could have imposed heavy delay upon us and might possibly have been able to reorganise his mounted arm so that he need never have given up the place. We, in our turn, might well have been forced to waste our strength in investing Tobruk.

Our enemies were untutored in the ways of classical war ; so also were our friends. In 1939 the Poles, than whom there can have been no more optimistic warriors in this war, set out, on the wide plains of Poland, a positional army with an archaic mounted arm on horses. The positional army lay on a defensive position in a scattered line of about 900 miles in length. In eighteen days a comparatively small German armoured force drove through the gaps and through the light defences on this long line, concentrating strength against the usual weakness of the linear defence, breaking the Polish army into incoherent and disorganised fractions, and putting paid to Polish national existence. But about two hundred years earlier Marshal Saxe had planned in detail and with sagacity the method by which Poland must be economically held, that is, on an area system of fortresses at the strategic places. This is shown in the sketch on page 39.

VIII

MALAYA AND BURMAH

WE will now return to history and to the Malayan campaign, which was starting while Rommel was being beaten out on the sands between Tobruk and Agheila.

The Malayan theatre of war was one in which, with the light infantry as the primary mobile arm operating wherever possible with tanks, our three conditions of area warfare were fulfilled. Therefore, the whole strategic operation could not be fought out on a linear pattern and every tactical linear defence would have at least one open flank and so could not be held in place except by a superior arm of manœuvre of light infantry and tanks. We had no tanks in that theatre of war.

I hope I have shown that the classical pattern of war-theatre has to be properly laid out, for each fortress or fortress-area must have within it supplies and other munitions to hold out long enough without relief to prevent its becoming a liability and hindering the freedom of operation of the army of manœuvre. There was ample time to lay out this system in Malaya between September, 1939, and December, 1941. Shall I be told that no one had yet foreseen war with Japan? I cannot accept that contention without admitting that there is no limit to the determination of the British to deceive themselves. It was many years since a Japanese naval Lieut. Commander, Tota Ishimaru, wrote a book, the title of which, as far as I remember was, *Japan must fight Britain*. For many years the Japanese had been seeking every means to degrade Europeans in the East. Since then the Japanese had entered Indo-China. Time was thus available in which to prepare the Malayan theatre of war, but apparently the knowledge of how to prepare it was not available.

In discussing the desert positions which could be held by a weaker force—ours or the enemy's—with advantage, we saw

that they were but few and that no intermediate positions existed. It was so in Malaya, for we lacked the arm of manoeuvre. This being the case, then at least, even though we had made the dire mistake of setting out no fortress-areas, we could have withdrawn straight from one advantageous position to the next in one long bound, and not have dallied so long as to be severely handled each time when a flank was inevitably turned or our weak linear position penetrated by armour. But we dallied, just as the Army dallied between Benghazi and Derna in January, 1942, and as it dallied between Tobruk and El Alamein in the summer of 1942. In North Africa, as in Malaya, in this way we lost heavily in men and equipment. It was worse in Malaya, where the nature of the country made for far greater confusion and dislocation, and thus for greater loss of the power of control. In these adverse circumstances troops not unnaturally became worn-out and dispirited.

After the Malaya campaign was over we were told that a principal cause of the defeat was that the men were not trained. I cannot accept this, for a large number of these troops were regular soldiers. In my opinion they were adequately trained in Malaya to carry out operations in the tactical manner envisaged by the Malayan Command in their official guides. But these guides did not touch the wider issue of area fighting and in so neglecting it they ignored the fact that operations could normally be successfully developed in considerable strength, well away from the roads and, such being the case, among other things a considerable force of cross-country transport—by porter, even by mule, if possible by air—was an essential thing. These guides envisaged only the use of small forces off the road. Almost, but not entirely, they advocated the snake-like formation I have before described when the young officer found himself so handicapped by its rigidity and vulnerability that he was unable to fight effectively in the operations in Assam of 1918.

It is a poor commander who blames his failure on his men. The Indian Divisions and many other troops were in Malaya for some months before hostilities started. From what I hear,

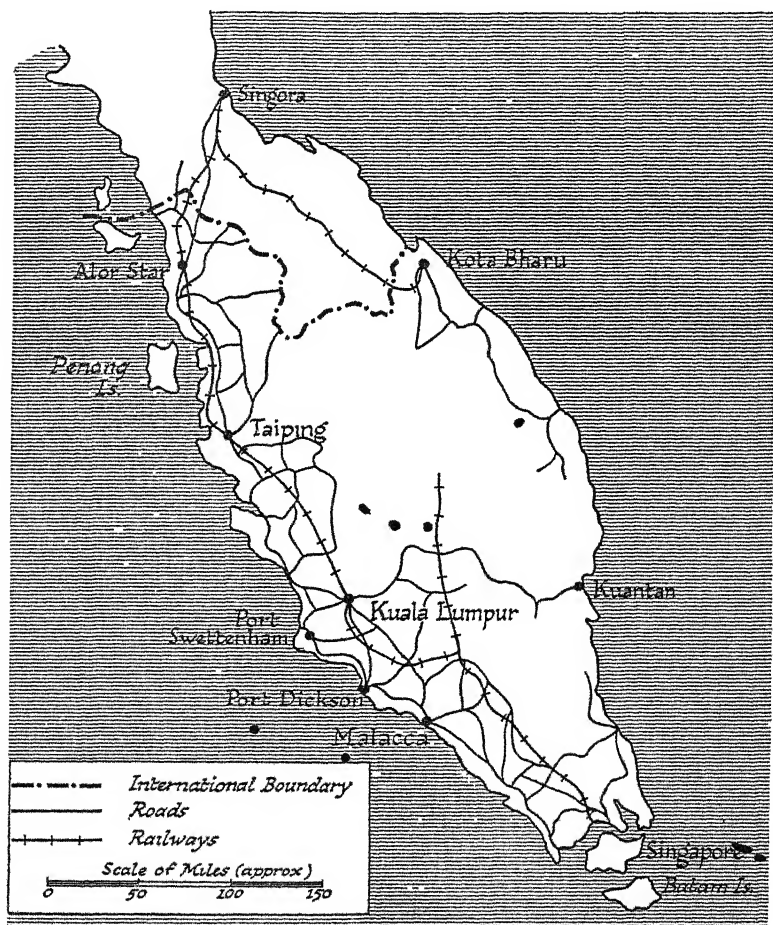
most of these troops trained continually within the terms of the training pamphlet on forest fighting issued by Malayan Headquarters. Perhaps they should have gone outside it and trained in the ways of fighting recommended in 1940, in the Indian Army pamphlet on forest fighting, and in the Indian Army training memorandum of the spring of 1941. The latter advocated an area system of fighting, the classical war of manoeuvre, and the use of the light infantry supplied by porter and by air as a main component of the arm of manoeuvre. Without reservation the memorandum applied our three conditions to the Malayan theatre and their effects were later expanded in the publication *Combined Warfare* of early 1941, applying them to the operations of all three services designed to hold in place and to step methodically forward the air bases from which the full powers of our air force would be developed. But these troops were obviously not entitled to fight on Indian Army methods of area war while they were under the control of another army, under whose auspices the directive for fighting would be issued. In Rome we must do as the Romans do.

Therefore, whoever has blamed those below him for the failure ought to realise that he himself was partner to the instructions in the Malayan pamphlet, although he may not have actually published it. Moreover, he should recognise that it was that pamphlet which put the whole army off "on the wrong leg" and so on the wrong tactical policy. This error, added to the resulting fact that the theatre of war was not organised for the classical and right type of fighting, gives the true reasons for failure. Failure was not the direct responsibility of those who actually trained the troops, nor did failure lie directly with any attributable lack of fighting spirit in the army, for in spite of a growing want of confidence, the majority fought to the very end. For the initial mistake they suffered three and a half years of privation and cruelty.

It is not difficult to gauge the advisability of holding Singapore Island as an isolated fortress of the Malayan campaign if we set the problem against all that has been said here about the traditional manner of waging war. If it could stand without being a liability to the army of manoeuvre, then it would

be advantageously held. If not, then the army of manœuvre must realise that it will have to fight in the end for Singapore to keep that place from falling into enemy hands, even if not for use by our own strategical mobile forces of sea, land and air from over the oceans.

With most of the communications running down the west side of the Malayan Peninsula (see Map below), it is obvious that the fortress system would be first designed to cover these communications, to deny them to the enemy and keep them for ourselves. Without reconnaissance of the country we



cannot exactly site them, nor can we state definitely that if Singapore Island had been regarded only as a weak fortress-area we could have held it in place by siting other fortresses near it and from them operating our army of manoeuvre to cut in on the tail of any force launched to the assault or committed to the investment of Singapore. From the map it seems that we could have utilised this system with advantage. Could we thus have held Malaya or even the vital parts of it?

We lost our air power and our sea power very early. Let us assume that we could not, even by a good preparation of our fortress-areas, have kept our air power in place, and that the loss of sea power was inevitable. For a period our fortress-areas would have had a bad time, but, with Japanese air forces employed all over the South-west Pacific, and our army of manoeuvre striking at the enemy air bases in Malaya, it need not perhaps have been a quite intolerable time. Air reinforcements were on their way from the Middle East. Perhaps the fortresses could have held out till they arrived and could have accepted them, especially as the fortress-areas would have held within themselves their own airfields which we hope would have been kept clear, though much battered by bombing.

If we could not have held Malaya, we could at least have imposed great delay on the Japanese and inflicted much loss before we were finally defeated.

While speaking of the charge that our men in Malaya lacked training I may here logically recount something of the Arakan operations of 1942-43.

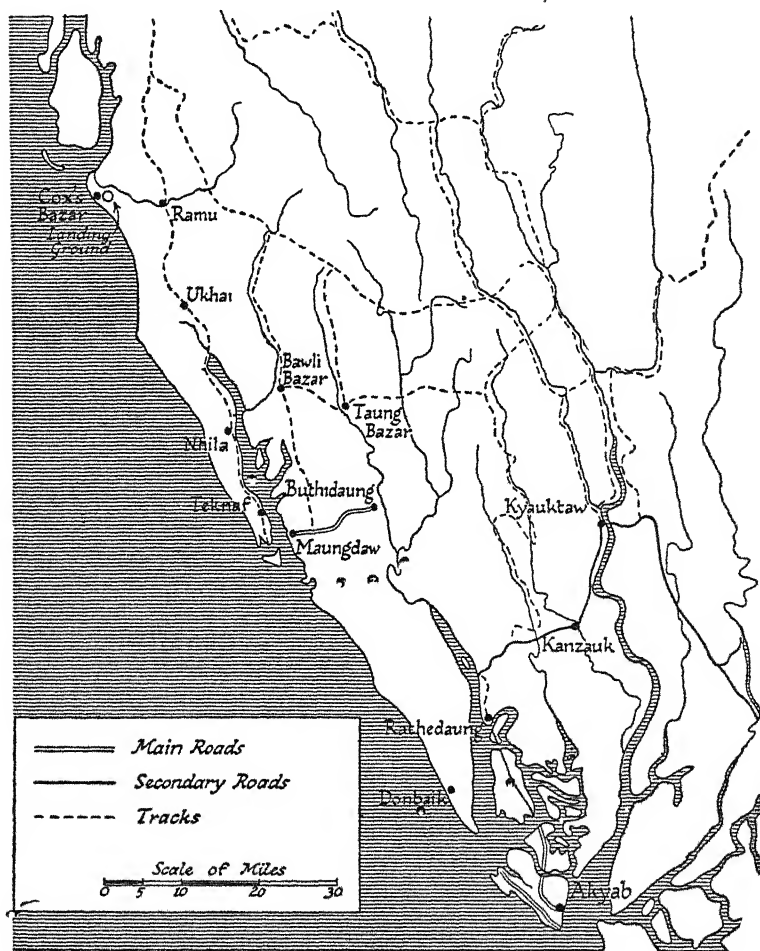
Here, again, the higher command complained that lack of training was one of the main factors which led to failure in the Arakan. It may be so, but there were cogent reasons why many of these unfortunate troops were untrained, and since it was patent that recruits with only four months training at their depots would be of little use as reinforcements in battle against veteran Japanese, it must be accepted that no ambitious campaign should have been embarked upon at that time by the higher command. One does not try to bore a hole in a battleship's armour with a brace and bit.

The conditions of the theatre of war were the same three conditions that we now know so well. The plan was for a long narrow thrust down the coast for a distance of well over one hundred miles from the base at Cox's Bazaar. The last fifty miles of the line of communications were by country boat, and operations were much handicapped by the tides. *But classical war demands a war of areas, not a war of the long thrust against an unshaken enemy, with all the waste of effort on one's own line of communications, and a long, vulnerable flank to be protected. It demands that fortress bases be established and that the army of manœuvre should operate from and between them. It also demands that forces operate in all directions on many thrust lines at will and not straight along the one thrust line. It demands that we do the secret thing and not the obvious.*

The army, a trained army that quickly picked up forest fighting, advanced on its single road as far as Buthidaung, with a forward base at Maungdaw (see Map on next page). It was at the end of its administrative reach, and was forced on to the defensive by the Japanese hooking in round the flank on to the attenuated line of communications. From its force of manœuvre it threw out useless liabilities in the shape of small detachments. Strategically our army was itself one great liability. With much depleted power of manœuvre it was stuck up against an enemy who was on the counter-offensive with a short and very good line of communications by water, running forward from his nearby base at Akyab. This base was an exceedingly difficult place for us to capture from the landward side. Had our forces in the Arakan been given the air lift allotted to Wingate's spectacular and sterile contemporary enterprise they would have built up fortified bases to front and flank of their enemy. Complete freedom of manœuvre would have been gained by this means and by direct air-supply to the force of manœuvre wherever it was operating.

It was all this that led to disaster far more than the untrained state of the reinforcements, the boys hastily dragged from our depots when barely half-trained, those left over after the drafts had been sent to make good the fearful losses of the 1942

disaster of the Western Desert. With a wrong conception of the nature of war in such areas as the Arakan we were so placed that only the very finest trained men, with an adequate cross-country mobile porter or mule train, could have possibly staved off at that time the collapse that occurred. Half-trained and less than half-trained, our reinforcements had no hope of staving it off. They must not be blamed, for the higher command plans its campaign in accordance with the



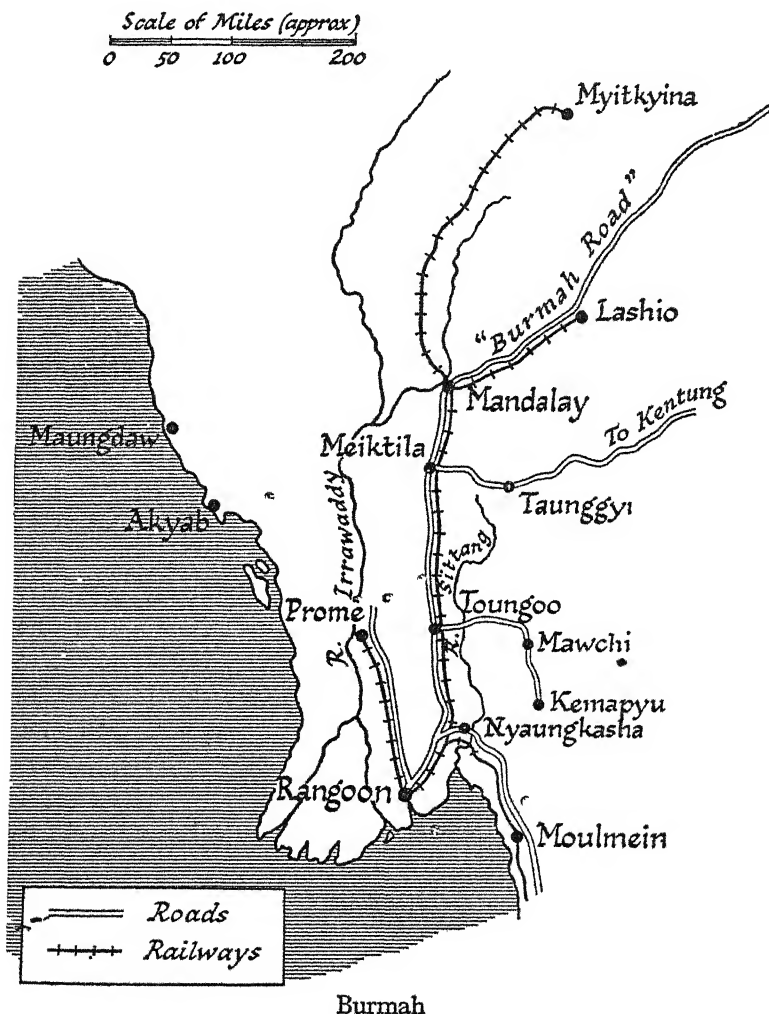
means it expects to have at its disposal. Success or failure depends upon this assessment, this necessary approach to battle, as much as on using the proper method of fighting in a given theatre of war. Lack of training only made failure the worse : it did not cause it.

I have not heard the defeat in the Burmah campaign of early 1942 attributed to lack of training among the officers and men. I have heard it attributed to dispersion in the early phases by making unwise detachments from the main army of manoeuvre. That criticism appears to be fully justified.

The making of detachments is only too often misused. At this point, it is only necessary to discuss the place that the defensive detachment takes in the war of manoeuvre. Later on, when speaking about operations at Gazala, in 1942, we will examine the value of the fortified post at Bir Hacheim on the left flank of the Gazala position, and that at El Hamra on the Sollum position. In Burmah the posts were smaller. They were scattered in smaller bodies far out to the east and north-east of Moulmein ; in the north on the Taunggyi—Kentung road ; in the central sector, from Toungoo to Mawchi and Kemapyu ; blocking most of the possible road approaches (see Map, page 72). To put out a number of detachments from the main manoeuvre force seriously weakens that force in numbers. If the detachments are to hold, then they must be strong enough and supplied with water and stocked in all respects to stand siege operations, which they must be willing to stand. If they are not so stocked then they must be no bigger—the smaller the better—than is needed to perform their specified role of delay or observation and still small enough and mobile enough to get away easily without undue loss. There is nothing more shaking to the spirit of soldiers than the employment of ill-considered detachments which are eaten up one by one, usually after suffering great hardships.

There is no compromise between the two types of defensive detachment. To compromise invites failure and heavy losses such as were incurred by those Burmah detachments, by the detached post at Bir Hacheim in June, 1942, and, on a small

scale by the battalion at Nyaungkasha in Burmah, in July, 1945. The garrison at Nyaungkasha was isolated in waterlogged country and while lacking mobility was not munitioned to outlast enemy siege. The defeats inflicted on these detachments had in every case a bad effect on the rest of the formation, the least being the failure at the last-named place, when the troops had their tails right up after inflicting crushing defeats on the Japanese armies.



The last phase of the Burmah campaign shows the power of manœuvre operating in its usual and well-known manner.

The rapid thrusts from the north of Burmah down the Prome and Rangoon roads, in 1945, split the Japanese forces into many pieces. On our part it was a great feat of arms, but we are inclined to forget that in its accomplishment it struck from the Japanese commander that vital weapon, his power of manœuvre, which was far more useful to him than any Samurai sword. In the first place he was weak in armour and motor transport. We destroyed both these at the very time when the mechanised arm of manœuvre was most important to him in the broad valleys of Burmah. As we rolled south we threw his pedestrian arms off the roads and in our turn took control of those roads. In this way our army became highly mobile in its M.T. up and down the roads, and with tracks and sometimes wheels across the hard going of the paddy fields and along the many bullock-cart paths. He, in his turn thrown off the plains into the hills, was badly served by roads, especially lateral roads. In the end, he had to abandon most of his guns and the rest of his M.T. Our army, with considerable power of manœuvre, then laid siege from both sides to his 28th Army in the field in the Pegu Yomas, the hill tract west of Pegu. A few of his forces got away by individual sallies but the rest were invested. Time wore on and supplies ran short : disease set in. At last, debilitated and desperate, on the night of 19/20 July, 1945, the remains of the Japanese 28th Army made its great bid to break away eastwards. On the banks of the Sittang it was destroyed by the 17th and 19th Indian Divisions who used that priceless road and priceless motor transport to forestall their pedestrian enemy on his main thrust line. Seldom in history has an army suffered such complete destruction in battle as did the Japanese 28th Army in its operations in Burmah.

IX

NOTES ON THE RUSSIAN CAMPAIGN

BEFORE these bickerings of Malaya and Burmah the great massacre had started on Russian soil. The Germans launched a great army on an immense front, a lot of that army horse-drawn and composed of marching infantry. The Russian forward positions in Poland and Western Russia were soon penetrated: the Russian army's northern flank was driven back on Smolensk. There they sought to stem the advance of the invading German army and to no small extent succeeded in their aim. The German army, slowed down owing to lack of a proper cross-country administrative train for their army of manœuvre, failed to bring about the outflanking operation which would have enabled them to cut off their enemy's retreat and to deal with him with some deliberation. The Russian army, no more mobile than its enemy, succeeded in drawing away in sufficiently good fettle to be able to fight again for many a day.

The great German sweep on Moscow brought a considerable armoured force to the very gates of that city, even as Stalin, against the advice of his Marshals (it is said), was grabbing every reserve unit and formation on which he could lay hands and thrusting them into the great gaps in the defences of Moscow. Does it not seem that those defences had never been prepared in order to accept the garrison of this great fortress? May we not rightly judge that the Russian generals had no real understanding of the pattern on which a war of manœuvre must be fought? Moscow was saved by this thin dribble of reinforcements, and because the Germans hesitated to attack in force and at once—perhaps because they had outrun their motor transport train, perhaps because they believed the defences of the city to be in better order than in fact they

were. Stalin's instinct was right. Being weaker in the arm of manœuvre, he put his pedestrian army into a fortress defence.

I think it must be accepted that, if the German army had had a fully equipped and powerful army of manœuvre, fed by a highly mobile cross-country administrative train and backed by a mobile and powerful siege train of heavy land and air forces, then Moscow at least would have fallen. With the fall of the city the German army of manœuvre could have entered Moscow and Leningrad and driven into the rear of the Russian field armies. It is doubtful whether even at Smolensk the Russian northern wing would have ever got back to the refuge of the fortresses that lay to its rear. But the trouble with Hitler and his general staff was that, although they had realised that it was by speed they could destroy the Russian army, they had not thrown aside every other consideration, made speed the means by which the maximum fighting power—and so the power of manœuvre—was to be developed, and then made this form of surprise thorough.

That the selected form of surprise must be thorough is here shown to be one of the rules of war. Moreover, in Russia more than in other countries the lack of railways made all the more necessary a very high degree of "motorisation" and of provision of cross-country administrative vehicles. The German army was encumbered by great horse-drawn trains and slow-moving infantry. These may have been of use for operations where armour could not travel, or for holding as positional troops each great base as it was conquered; but they were simply an added strain on military resources lacking the mobility to fight the great offensive of a manœuvring army travelling at high speed over suitable country.

The tale of Moscow is repeated, with a little variety in success and failure, at each of the great Russian city fortresses, Leningrad, Kharkov, Kiev, Odessa, the Crimea, and finally at Stalingrad. By force of circumstance or, less likely, with design and preparation Stalin sought refuge for his battered armies in and about these places, while his field army of manœuvre pivoted upon them or restored itself in the delay

they caused. At last, as we all know, the industries of the Urals and East of the Urals, with Allied help, replenished the equipment and munitions for Stalin's field army. With the dropping dead of the final German attempt to storm Stalingrad, and the complete weariness resulting from the failure, the Russians sprang back to the counter-offensive. Later on in this book I shall show how significant it is that the Russians launched their successful onslaught from these great Euro-Asiatic bases east of the Urals.



In Russia also the pattern of traditional war was now coming to follow the ancient and familiar pattern, for those conditions that regulated the pattern were having their effect, compelling a certain type of warfare whether the combatants designed it or not.

X

GAZALA TO EL ALAMEIN:

* FEB.-OCT., 1942

IN late May, 1942, opened the operations which started with the disastrous battle of Gazala and ended in late August with Rommel's unsuccessful attempt to turn the south flank of the El Alamein position.

In war it is the approach to battle which matters, far more than the battle itself. I hope that in speaking of Malaya and Burmah I have made this clear—that the approach, the preparation for battle is the deciding thing. That approach includes almost all activities that there are before battle—the right conception of the nature of the war : the right training and equipment for it on the right tactical policy : the right laying out of the theatre of war if we are to be on the defensive : the planned and deliberate steps by which it will be laid out if we are to take the offensive : and so on. The seeds of defeat were sown at Gazala in February, 1942, though the battle opened as late as May 27 of that year. The harvest was reaped by our enemy as late as the middle of July, when he came to rest on the threshold of the Nile Delta, at the stretch of his administrative tether.

Now look at the Map on page 84.

After the retreat from Benghazi of January—February, 1942, the 8th Army was ordered to take up a defensive position at Gazala. The position designed by that army was to be linear and there was to be a great gap (just to the north of Bir Hacheim) in the left centre of the position. The gap was closed with a considerable minefield, and one brigade was finally placed about the centre of this belt of mines. The centre of the whole position was echeloned back a little. In effect, however, it was a line *and we know that a line with an open flank cannot hope to be kept in place unless we are certain that*

our arm of manœuvre can destroy that of our enemy. If we are not so certain, then we must content ourselves with making use of some fortress-area. As it happened, a couple of weeks earlier we had lost the whole of one armoured division in a great armoured battle about Antelat and Msus, while the other, fairly worn out after the prolonged struggles of November and December, had been sent back to refit in the Delta. In any case, our tanks were mainly cruisers mounting a two-pounder gun. Later on we were expecting to get some Grants, with a 75-millimetre gun. These would be a great advance but they had a rather serious defect. The 75-millimetre was not in the turret as is usual; it fired from a low platform which made it impossible for it to get hull-down below cover, and the gun being mounted in a sponson it had little traverse compared with the all-round traverse of the turret gun. The German tanks had 50-millimetre and 75-millimetre guns, mounted in the turret. With these they could get hull-down to fire from behind cover, showing only the turret, a small mark for us to hit. They could get, too, an all-round traverse and so had no blind spot from which they could be attacked without being able at once to hit back. The Germans were a good deal stronger in the arm of manœuvre and were likely to remain so for some time. So we had no business to be designing a linear field defensive position.

To support our tanks and for our infantry to ward off tank attack we had two-pounder guns and not by any means a full equipment even of these. Confidence in that little gun was kept up by tales of the great things it had accomplished, but we all knew how hard it was to induce tanks in the open desert to come within 200 or even 300 yards of a two-pounder before first knocking out our pigmy anti-tank weapon with better guns. Six-pounders were expected later on in the early summer. Against our light equipment the Germans placed their 50-millimetre (about six-pounder) anti-tank gun and their 88-millimetre anti-tank and anti-aircraft gun. The latter completely outshot any tank or anti-tank gun we possessed, so even in our mobile infantry we were desperately inferior to the Germans in defence against tank attack. In fact, we were still

basing our anti-tank defence on the 25-pounder field gun with its solid shot.

At the bottom of the Gazala position was to be dug the locality of Bir Hacheim. As can be seen in the sketch, Bir Hacheim hangs very much like a ripe pear on the end of a rotten stalk, the rotten stalk being the connecting minefield area. It proved indeed to be a rotten fruit.

In Tunisia in 1943, about Gafsa and south of the Halluf Pass, the Germans made great play with scattered marshes of mines of considerable extent, in many cases just dug in promiscuously. Sometimes these were not even watched by mobile forces. They were there solely to delay as long as possible, and they did impose great caution upon forces trying to bring wheeled or tracked vehicles through the area. In the Gafsa neighbourhood they were in great depth and thickly sown; near the Halluf Pass they were also in great depth, but lightly scattered about the hard going that lay between the soft sand dunes. Both fields did yeoman work for the Germans. (In Italy, Burmah and North-Western Europe we became unused to meeting thick and extensive minefields: we must not ignore the future of minefields.)

But here at Gazala they were in no great depth and yet they were an integral part of a defensive position, not just a slowing-up area in the desert or on some definite approach, that would make armoured forces hesitate to move and thus canalise their movement through the minefields. The narrow movement thus enjoined gives good targets to the air and the delay allows mobile forces to come up with the enemy from one or other side of the minefield and catch him at a disadvantage while he is penetrating. At Gazala, however, this field was a definite part of the defensive position and not merely a subsidiary to it. But it was hardly watched. There are immense uses—and valuable uses—which can be made from the proper installing of the mine obstacle, but it must be laid out with a definite purpose in mind and as an effective part of a plan. There will always be argument as to whether in order to effect surprise on the enemy, mine areas should be left unmarked. Sometimes perhaps they should be left so, but the area must be absolutely

forbidden to our own troops and must be carefully marked on maps so that it can be wired off whenever the situation changes. The better plan, however, is to *mark and wire off far more minefields than actually exist*: the effect on an enemy of doing this is too obvious to explain beyond saying that it imposes unnecessary caution which leads to carelessness.

Bir Hacheim had no perennial water-supply and no great water tanks to last many days, let alone weeks. It had, as was proved, only enough ammunition for a few days' fighting. It was completely isolated and could easily be invested by the enemy. If invested it would have to be relieved and supplies poured in, or else it must be abandoned to the enemy. It was a fatal liability, and to make the liability even more burdensome the place was garrisoned by the Free French. I do not want to imply that these men were not great fighters. I do imply that if it were invested or cut off we should be accused of abandoning an ally if we did not hasten to relieve it and actually succeed in relieving it. This liability was to colour the whole of the plans of the 8th Army during the battle of Gazala. It was more costly to us than was the village of Blenheim to the French army which faced Marlborough.

Tobruk was the key to the invasion of Egypt: without that port Rommel could not attack the Delta, with it he could. I have talked of the value of Tobruk.

Until the last few days before it fell, there was not any intention of holding Tobruk. If forced to leave the Gazala position the army was to draw back on to the Sollum line; but if it were forced to leave the Gazala position it would mean that our arm of manœuvre had been beaten. This, in turn, meant that it would be most difficult to fend off the enemy's armoured onslaught to enable the rest of the army to draw back in any good order on to Sollum; not only that, the Sollum position being virtually linear, it too could not be held effectively without a superior mobile arm.

There were other liabilities that might possibly appear. For instance, if Rommel penetrated just south of the escarpment along its crest, not far from Gazala, he would cut off the South African division between himself and the coast.

Thus it will be seen that, by the cutting-off either of Bir Hacheim or of the South Africans up by the coast, our armoured forces weak and therefore to be saved from decisive battle, would be forced into an unwanted fight by the very nature of our main dispositions, our "approach to battle." Here were sown the seeds of defeat for, unless we were very lucky, from that bad approach all things had to go wrong.

Rommel attacked at the end of May by passing round our south flank south of Bir Hacheim with three armoured divisions, backed as usual by his lorry-borne infantry. Echeloned back from that left flank, and isolated from each other without water or sufficient supplies, were three smaller positions. From west to east there were the 3rd Indian Motor Brigade, 7th Motor Brigade, 29th Indian Brigade. All had been dug in to a greater or less extent and told to fight to the last man and the last round. It is hard to understand why those brigades were ever sited in these places. They protected nothing but desert sand, were on their feet in trenches and had no proper supplies. There was no need to attack them and their fate, if they did not mount their motor vehicles and depart, was certain.

Rommel overran the 3rd Indian Motor Brigade, who had just dropped into position, but only after a stiff fight. To attack that brigade was about the most unwise thing that he did; he need only have driven round it, masked it off with a little armour, and waited for it to move and be destroyed by his armour, or he might have held it to its position after picking off its motor transport, and there left it to thirst. That attack cost him more than fifty tanks completely burnt out before the 3rd Brigade was almost entirely rounded up. Armed with two-pounders and 25-pounders firing solid shot, with few or no six-pounders, the 3rd Indian Motor Brigade fought a battle that must rank with the achievement at Alam-ein of that fine regiment, the Rifle Brigade, better equipped as the latter were. Meanwhile, the 7th Brigade did the wisest thing it could, got on to its motor vehicles and became mobile. The 29th Brigade was not at once involved and in due course,

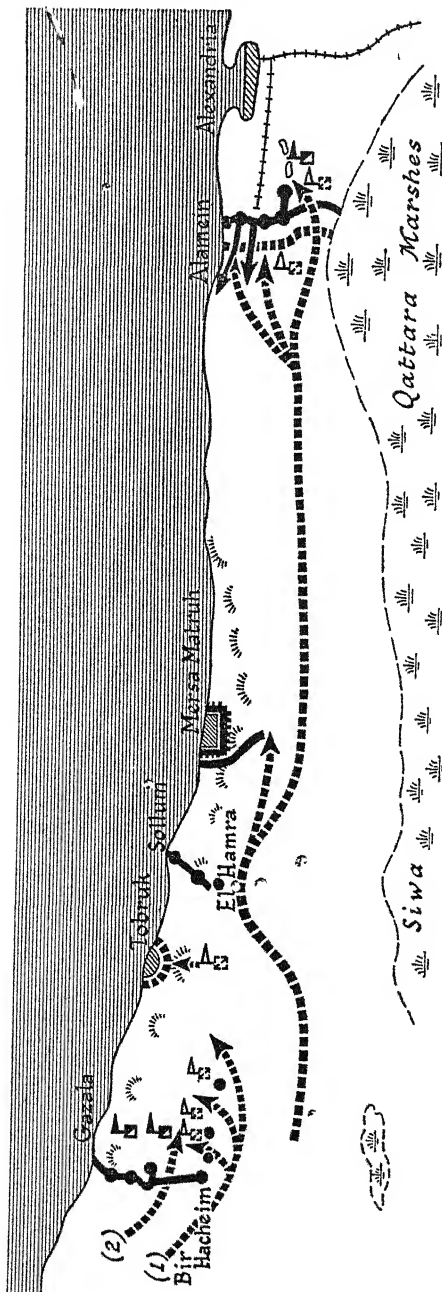
having achieved little owing to its unimportant position, was safely drawn out.

Rommel passed on over the remains of the 3rd Indian Motor Brigade, fought a successful tank action and then took rather a bloody nose. But by now he was in a position to cover the next thrust through the open minefield after eating up the single isolated brigade that covered it, short of water and ammunition. Bir Hacheim was now cut off, and all the efforts of the 8th Army which should have been devoted towards a concentrated counterblow, preferably to sever the supply system to Rommel's arm of manoeuvre, were devoted to the attempt to relieve that place. In the end it was evacuated, but the damage was done and the army's reserves scattered over the face of the desert.

A further thrust northwards and Rommel produced the second liability, the whole northern flank of the Gazala position. In great haste and some confusion the attempt was now made to conduct a general withdrawal from the Gazala line of the almost-surrounded forces. Luckily that infantry had its motor vehicles close behind, so could mount its men. A great part of them came out, but our losses there and in the subsequent retreat ran into many thousands of men and great stores of equipment. Our ordnance depots, laid out on the open desert, were left behind for the enemy.

Hoping soon to relieve it, the decision was now taken to leave Tobruk to temporary investment. But by then our arm of manoeuvre had already been destroyed and Tobruk was in no state to accept siege, nor had the orders for an active defence of the place by mixed columns led anyone to prepare for siege. Its eastern defences, a brigade on twelve miles of front, had negligible minefields and virtually no anti-tank guns. The end was sure. Tobruk fell. With its fall soared Rommel's opportunity to assail Egypt.

So long as Tobruk held, so long would Rommel have been prevented from invading Egypt. That fact is proved by reference to the situation which prevailed in 1941, as shown on Map on page 22 : the fortress being a refuge and a vital part of the whole defensive plan.



Gazala to Alamein, May-October, 1942

What should the 8th Army have done to defend themselves against Rommel, if it was wrong to stand on the linear defences at Gazala? How could the 8th Army have avoided getting its arm of manœuvre committed against its will to a decisive battle? More, how could that army have staged an effective counter-blow at a time of its own choosing?

There are variations from the plan here proposed but they are not material variations. One is that a position west of Tobruk should have been held from escarpment to sea with fortress Tobruk behind to back it, and other positions lying along the escarpment as far east as Gambut. There are other possible modifications but all of them amount to designing the method by which a fortress-area could have been produced about Tobruk. The final lay-out that I suggest can be followed from Maps on pages 22 and 84.

Tobruk should have been firmly held as a fortress, with munitions, supplies, and water for six months so that there should be no need to re-supply by sea. Other strong positions should have been swung back from it along the escarpment to cover the Gambut airfield, in case the enemy were to move along the top of the escarpment: to cover the gaps in the escarpment at Sidi Razegh, Gambut and Bardia. El Adem should have been regarded as a special problem and troops disposed either to cut off a movement through that gap or actually to block its approach. Out in front, with their noses up against the enemy, should have been the mobile observation columns with which we were so familiar and which we operated so well. Our main armoured force should have refused battle until such time as it was re-equipped and ready to accept it on its own terms.

We had at our disposal the following formations: 1st South African Division, 2nd South African Division, 4th Indian Division, 50th Division, 29th Indian Brigade, the Guards Brigade, a Polish Brigade, and a Free French Brigade. That is, about five infantry divisions. We could dispose them for this system of defence in this manner:

Two Divisions—Tobruk, El Adem.

One Division—Sidi Razegh.

One Division—Gambut, Bardia. (Of this division I estimate that two brigades could have been used as a reserve for filling up the garrisons of any fortress against which the enemy was about to launch a heavy attack. The further the enemy moved along the top of the escarpment the longer his administrative chain, the more vulnerable it became and so the less the strength that he could launch against any rearward fortress.)

The 4th Indian Division—lorried to support the armour.

In April, the 5th Indian Division came up. That gave us a considerable strength in infantry. The garrison of Cyprus and of Palestine would have been provided from troops in Iraq, who in fact did finally come through to the Western Desert while the battle of Gazala was raging.

A short explanation is needed as to how such an area of defence is operated. The positions, except for those which are directly threatened, are held with a nucleus garrison. As soon as the main thrust line of the enemy's attack is discerned the rearward positions of the threatened fortress are filled up from mobile reserves which are waiting for the order. It would be desirable to be able to fill up any single fortress position to *at least* the strength of one division, so positions should be ready and the fortress supplied to expect such a garrison and maintain it for the desired time. In this way, if Rommel threw his 90th Light Division and two Italian Divisions against any fortress position of ours he would be held. With the supporting weapons at his disposal it is not conceivable that he could have effectively launched more. The fortress-area at Sidi Razegh would have been able to hold two divisions and so be capable of holding out against an even heavier attack. The plan would have been to induce Rommel to attack these powerful positions and so waste his fighting strength while we conserved ours. He would have needed to use armour in the assault on all these positions and he must have lost heavily in the attempt, thus reducing his arm of

manœuvre.¹ Our armour would draw back in good time before the German armoured force.

Rommel could have passed along the top of this escarpment in order to penetrate at Gambut or Bardia, and the further east he went the more exposed his communications and the more meagre his spearhead. He could have tried to go northwards below the escarpment on to the coastal plain, moving between our fortresses, but only with great difficulty could his motor vehicles have followed and they certainly could not have drawn back up the escarpment in order to supply him. In this position our armour from above the escarpment could have corked him up between escarpment and sea. The only plan left to him would have been to invest and assault one of the fortress positions, and that was what was most desirable for ourselves.

It was essential that our armoured force should be supported by a highly mobile and well-experienced infantry division, for without that support it would find itself lacking in the ability to check the enemy as it wished, in order to avoid battle, to threaten its enemy from the flank without using up a great deal of its own track mileage, and to protect its own flank when its main body engaged.

The actual outcome was that the 5th and, later, the 10th Indian Divisions were decimated in small packets in the Battle of the Cauldron or in the retreat from the Gazala area. Again, the fault was in no wise theirs: it lay in the "approach" to this battle. But many people, unlearned in the ways of war, were very ready to fasten blame on the officers and men of the Indian Divisions. It is always unfair to blame subordinate formations and units before all the facts are known. Those were dark days for our Indian army. In Eritrea, Burmah and Italy those two divisions showed themselves to be outstanding divisions in any army. At Gazala they were submitted to piecemeal defeat by ill planning. The story will one day be told of the quite unsuitable improvised system of Corps Command adopted from the first day of the battle: it had a great deal to do with the fragmentary and costly methods of fighting.

In the end, Gazala had to be given up, and parts of the Army,

much mixed up, got back to the Sollum position. The 1st South African Division, under Major-General Dan Pienaar, reached their allotted position at El Hamra, but its commander decided at once that it would be as dangerous to try to hold that place as it would have been to hold Bir Hacheim. El Hamra was like Bir Hacheim, except that it held three months' water, munitions and all supplies; but like its infamous counterpart it protected nothing but sand, and it too hung like a rather less ripe pear on the end of a rather stronger stalk. It could hold for three months, but as it protected nothing its holding was of little purpose unless the armour existed to use it as a base of operation. It would have been better placed if it had been thrown back along the escarpment, thus becoming a part of the Sollum-Halfaya-fortress-area. From there, too, it could have acted as a pivot for armour whenever we should have any to pivot on it. As it was, it was just the south end of a series of localities running in a line from Sollum and Halfaya. So General Pienaar passed it by.

At Sollum Major-General Rees rightly pointed out that the broken bits of troops on the Sollum line would not be able to hold the enemy for any length of time. Finally, the 1st South African Division not being content to stay and risk investment at El Hamra, his advice was accepted and the line abandoned. The 8th Army streamed eastwards, leaving Tobruk to its fate. Many prisoners and an immense amount of equipment fell into enemy hands.

Very large quantities of mines were sent up to Mersa Matruh for that place and its linear position to the south to be held. Without an arm of manœuvre it could not be held. Withdrawal was ordered but almost too late. New Zealanders, the 5th Indian Brigade, and remnants of the 10th Indian Division broke out through the enemy from Matruh and got clear away at night. By then there were considerable bodies of enemy between the garrison and Alamein.

At last, the decision was made to stop the enemy at Alamein and there, in July, he was brought to a stand on the only true fortress position between Tobruk and the Delta. There we restored our armour for the counter-offensive.

At this point I shall offer demonstrative proof of my contention with regard to the right manner of holding the Tobruk fortress.

Rommel attacked the Alamein fortress in late August. He brought his armour south and penetrated the mobile flank between the south flank of the position and the Qattara Depression. Fighting, that flank drew back to north and south. His infantry attacked our mobile infantry which had fallen back on to a strong position, and the Germans suffered heavily. His armour turned north and drove its head against the infantry defences which had been refused back (Map on p. 84), while our armour, avoiding battle, withdrew till right under the cover of those defences. Comfortably ensconced under the guns of the infantry our armour from concealed positions killed over 100 German tanks. Rommel gave it up and withdrew. Throughout, we had not been forced to commit our armour to decisive battle. It had drawn back almost unscathed, and fought only where it wanted to fight.

At the battle of Alamein we attacked the enemy, who produced before us a linear position with both its flanks closed. Our enemy was at the end of his tether and it was all he could do to keep that position in place administratively, let alone fill it up with water and stores. Indeed, without the captured supplies of Tobruk there is every reason to believe that he could not have stayed at Alamein. In Alamein fortress we built up huge dumps of stores. We had complete administrative superiority over our enemy. If we penetrated his position then we cut it off to north or south as we thought fit, and we besieged it on the battlefield with our mobile army, once we had destroyed his arm of manœuvre. We were in considerable superiority in the armoured forces.

So the tables of Gazala were now turned. The liability, with the pedestrian arms on their feet in trenches and in emplacements, was his, for we were now the stronger in the arm of manœuvre. *The battle took the normal course of the classical battle of penetration. The gap made: the enemy's armour brought to battle in its efforts to save the rest of the army, destroyed, and the infantry (of Carrhæ) besieged on the battlefield with immense loss in men and equipment.*

The pursuit, which could have been parallel and headed by our light cavalry in the old fashion—in 1942, with light armoured troops backed by the most mobile lorry-mounted infantry division—was pressed with the heavy cavalry. The Sherman tank petered out near Mersa Matruh—for want of petrol as much as anything—before it could cut off its enemy at the Sollum position's minefields and the Sollum and Halfaya passes. There is a broad strip of good, hard going for motor vehicles, that is, for lorried infantry, running from east to west north of the Qattara Depression right from Alamein to the area level with Tobruk and running up north-westwards from the Mersa Matruh-Siwa road to El Hamra, Sollum and Halfaya. It is possible, therefore, to use a wide, unhindered parallel pursuit with every hope of cutting in to stop an enemy retreat on to the Sollum Pass or through the Conference Cairn gap just north of El Hamra. Using this route it is possible to pursue with light forces.

Not too much hurried after he passed Sollum, Rommel got back by stages to Mareth in Tunisia. He never risked delaying on intermediate positions but jumped almost direct from Alamein to Agheila, where he delayed only long enough to draw breath before he was away again and through Tripoli to Mareth. It was sound sense to stand there, where he could link with Von Arnim, and where he could put out a fortress position against the 8th Army which took us a lot of trouble to breach. We broke it after we had opened a good base of supply close up at Tripoli. Rommel was supplied from reasonably close bases at Sfax and Sousse. As his army dropped back north it became administratively stronger, approaching its bases about Tunis while we left behind our best base at Tripoli.

TUNISIA-EUROPE AND SIEGE OPERATIONS

AT last in mid-April the Axis army closed itself up, and the whole area inside the arc from Enfidaville, through Medjz el Bab to Bizerta, became a closed fortress defence holding within it much warlike stores (Map, p. 85). The siege started and the air forces and navy set out to prevent relief and supply. They succeeded to an almost unexpected degree. The ability to move fighting strength was being whittled down ; the power of manœuvre of our enemy was sinking. He held a fortress-area but had no army of manœuvre.

There is an interesting point to be made here. We are speaking in terms of siege. Let us go on in these terms. The plan up to about 28th April was for the 8th Army to attack up the east coast, up and down the transverse ridges and extremely difficult ranges from Enfidaville to Hammamet. The attack was to be made in considerable force—three infantry divisions and an armoured division, a big proportion of the experienced troops at that time in North Africa.

In siege terms this meant an assault through rampart after rampart, glacis and redoubt arranged in complicated form, till a small oblique penetration into one of the outer suburbs of the city would be achieved. This would not bring success even if it came off, for it could not be final. More and more redoubts would have to be stormed till the centre of the city was reached at Tunis. But in any case the assault could not succeed, for although our eastern flank would be covered by the outer moat, the sea, the western flank was open to attack from strong, fresh and untouched reserves, ready in position on the rampart overlooking the attacker's narrow channel of penetration. The attacker would have been driven into the sea from the west to the east.¹

¹ In May, when the enemy was weakening, an attempt was made to capture the first of the transverse ridges. Even then, it failed gallantly and completely with much loss.

Better counsels prevailed, and the "Kashmerie Gate" of the Tunisian fortress was broken into at Medjz el Bab. Inside this gate was only a weak curtain of defence. After the stronger outer defences had fallen before a night assault, driven home by powerful artillery concentrations, soon after daylight the curtain was broken through by the infantry and artillery momentum. The centre of the fortress at Tunis was reached. The fortress was then cleaned up from inside as the army passed east and west to Cap Bon and Bizerta. The passage from the Tunisian plain north-eastwards on to the Cap Bon Peninsula and down to Hammamet was most gallantly made through the narrow opening of Hammam Lif near the coast. There was a far better entrance between the Zaghouan hill and the hills to the north, a veritable tank-run of great width, which led one straight to Hammamet and into the rolling hills of the Cap Bon Peninsula. Directly after the battle of the Medjerda a reconnaissance flight along the base of the Cap Bon Peninsula revealed little sign of any enemy positions or enemy movement. Twenty-four hours later, from an observation point on the Djebel Oust on the east side of the Tunisian plain, enemy could be seen trickling into place to make field positions to cover the entrance to Cap Bon. There were no signs of fully organised positions then or later, when our forces actually occupied this area. In any case, even had there been fully organised positions, the tank-run of which I have spoken through Ste. Marie du Zit was so broad and easy that we could have smashed through in a short space of time, without having to attack through the narrow defile at Hammam-Lif. It is more than probable that the Germans themselves saw how useless it would be to attempt to hold the base of the Cap Bon Peninsula, either on this line or, worse still, where the rolling country starts still further north-east.

At any rate, the powerful outer defences which opposed our movement up the east coast and covered Hammamet now surrendered peacefully whereas, in the original plan for the attack up the coast, they would have fought it out and defeated us and so put back the date of the invasion of Southern Europe and later that of North-Western Europe. There

is an art in the storming of fortresses and there always has been.

What of the siege train?

When partially invested at Alamein we first came up against the need for strong artillery bombardment to break heavy positions. We had only the 25-pounder and a few 4.5 medium guns and no assault tanks: we had no siege train: our aircraft were no greater than medium bombers. As yet there was no real knowledge of the need to apply air bombardment to pressing forward one's army through an enemy defence. At Alamein, perhaps, it was not needed, for German morale was not at its height. As far as we could make out their morale had certainly started to decline in July, 1942, when an Indian brigade attacked the enemy positions on the Ruweisat Ridge, driving them off the ridge in double-quick time and taking 1,500 prisoners. The spirit of the German soldier is unaccountable. With his feet on the threshold of Alexandria, surely his spirits should have remained high, yet there was this decline. Perhaps it was nostalgia, dysentery, and other desert conditions that worried him. At Alamein the close support of our air power was devoted to harrying the enemy's mobile forces and his administrative echelons. There is no doubt that the effect was excellent. Our infantry attacks were at night and would have been extremely difficult if not impossible to support closely with aircraft. They could have been helped by a softening process of air bombardment by day, but I do not suggest that at that time there were not better tasks to be fulfilled by our air forces.

At Mareth, the enemy position about the Wadi Zigzao was assailed at night. As we all know, later on the enemy armoured counter-attack developed. Given reasonable weather, this could have been stopped by heavy, constant and accurate air attack. To have held it, or to have rendered it still-born would have left the 50th Northumbrian Division in possession of the enemy's stronghold, with its foremost troops right through his defences and having a very good chance of getting a complete break-through when the reserve division came into the battle. In addition to this help, a softening-up process by air

bombardment about the area of attack from midday to dusk would certainly have made the infantry assault a good deal easier. It is always possible by careful planning to keep the enemy guessing as to the point of attack even when using a softening-up process of this sort.

In the last phase of the Tunisian campaign, in the Medjerda Valley, our air forces were used to some extent on the enemy's rearward positions. It was very hard to assess the effect of their attack. There was little to see for it, but more may have been achieved than one saw.

All this has something to do with siege operations—at Alamein, where we strove successfully to break out of a partially besieged position : at Mareth, where we tried to break head-on into a fortress over the moat of the Wadi Zigzao : at the Medjerda, where we burst through the main gate into the citadel.

It is another rule of war that whatever type of surprise we seek to achieve it must be thorough ; everything else must be subsidiary. If we decide that we shall surprise by weight of fire, then every single weapon of fire that can be collected and brought to bear effectively in the time at our disposal must be applied to the place of attack. When they are brought to bear, then they must strike together with all their weight successively on each separate point of resistance. *To obey this rule we must collect all our aircraft for the decisive stroke, all our guns, our mortars and our smaller weapons and in turn, within their range, we must strike with them all together upon each locality.* The exception to this rule is that we must leave out only those fire weapons that are for a diversionary attack. These should be as few as possible. A siege operation depends for success on brute force as much as anything, and firepower is brute force.

Nowhere in Africa, in Russia, in Italy, did we hear of a properly organised siege train. Only in North-western Europe, in 1944, does something of the sort appear, with the main weapon of bombardment, the heavy bomber, and with the armoured engineers all a recognised part of the train. With this partially organised train we broke into the cities of France and Germany. Had we possessed such a formation at Alamein

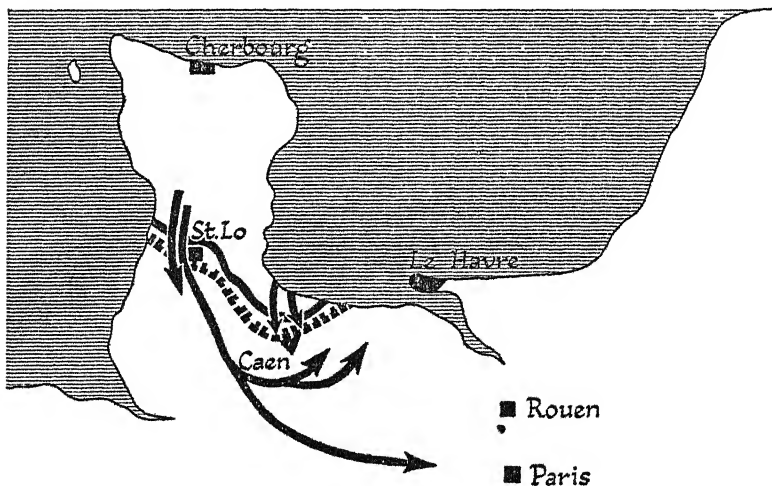
and at Mareth both battles would have been over in a few days. At Mareth the crossing of the moat and the throwing back of the counter-blow would have been provided for in the component parts of the siege train. That the organisation of such a train is designed to cater for the whole operation of a siege is itself a most important quality. There need be no appreciable improvisation, no snatching of assault tanks, of spare cross-country anti-tank weapons, untrained to the role and unused to working in with the other heavy siege weapons and heavy infantry. Thus, the fully organised siege train is as much a fixed component of an army as ever it was when the Mongols carried forward their catapults and mangonels against the Khwarizmian Emperor.

The great arm of siege bombardment became the heavy bomber. In Italy, on February 15, 1944, a demonstration of the vicious nature of such an attack by heavy bombers was given against the fortress of Monte Cassino. Only 500 tons of bombs were used but the effect was impressive. I will not discuss the later use of the heavy bomber against Cassino town, which lay at the foot of Monte Cassino, nor will I speak of the decision not to use it at all against Monte Cassino to pave the way for the infantry attack of February 19-20. History will examine these matters for us.

We can now pass on to the invasion of France in June, 1944 (Map opposite). *The pattern of war is not changing and the failure to realise that the classical pattern was the order of the day led to the rapid downfall of the German army.* Preparation for invasion naturally took the form of attacks on the enemy's power of manœuvre, his fighting power and his means of moving it. For years the homeland and its industries and communications had been harassed : now the blows were brought closer in to the scene of battle. The onslaught on his power of manœuvre was directed against concentrations of communications, railway repair and maintenance facilities, and of movement such as marshalling yards and locomotives in their depots. Fighting power was attacked wherever aircraft or assemblies of troops, particularly of mobile troops, could be found. Thus, when the time came for Rommel to shift his fighting strength to the

place of battle, he found that the means of movement were so damaged that he could only trickle his units forward. His power of manœuvre was whittled down. His air force almost annihilated, he had, on the other hand, no means by which to decrease our power of manœuvre. Unmolested, it grew, as more and more material poured forth to increase our fighting strength.

We landed mainly to the east of the Cherbourg Peninsula and struck inland. A British infantry brigade was to take Caen immediately after landing. It nearly "jumped" that



Rommel in Normandy, 1944

city but not quite. Had the way been paved by the great mobile bombardment arm of air power it should have succeeded. We came to rest temporarily on a line from near Caen across to the western side of the Cherbourg peninsula. There Rommel pressed upon us and fenced us off with a linear defence. *Note that linear defence, for his power of manœuvre was at a low ebb so his arm of manœuvre was weakened.*

Using the great weapon of siege bombardment—all forms of attack from heavy to fighter—Patton struck hard near St. Lo and carved through the enemy's linear defences a channel about seven miles wide. Stepping on the heels of this bom-

bardment came his mobile forces and into the open country beyond the German defences they swept. The British launched heavy bombers at Caen, and Caen fell. Turning north-east the American armour and mobile infantry encircled the German north flank, and in the pocket of Falaise von Kluge's army was besieged on the battlefield. Thus, in 1944 was fought another battle of classical form. The linear field defence, not upheld by a great arm of manœuvre, was burst, and the pedestrian arms with the weakened mobile force were destroyed where they stood.

The city fortresses of Northern France were attacked by our siege train and one by one they fell. They were not co-ordinated into a great fortress-area, so were isolated for attack. Our greatest difficulty was to force the enemy out of the fortress-area of South Holland. In the end it was done by turning it from the Lower Rhine, but had it possessed all the requirements of a proper fortress-area, then our crossing of the Rhine would have been a dangerous operation. As with Timur Aqa moving into Syria, we could not have left an active area on our flank. The linear defences west of the Rhine and on the Rhine itself presented us with no considerable difficulty in spite of the country. The fortress of Wesel was reduced by a great air bombardment and soon all was fluid for our mobile advance, pursuit, and for final victory.

Why did the German army try to hold us with a linear defence in Normandy? Why did it again try to defend Western Germany by linear defence? Surely, with great armies of manœuvre on land and in the air, the classical form of war, of fortresses, of sieges, of field armies had come back again? Surely, it was foolish to give us at all times the opportunity to create the strategical flank—the existence of which must be denied by both contestants in a war of manœuvre—by our break-through bombardment and assault of the strategical linear defence?

The pattern of war was the same. All that had happened was that the size of armies and their mobility had been scaled up; the land-space and its features had also been scaled up, till fortress-cities of the past had become great groups of fortress-

city areas with the city as only one locality of the system of defence. But the pattern had not changed.

To return for a moment to the Russo-German campaign. This took its expected course. The German army swept forward in great force on a front of many hundreds of miles. It used up its strength on the Russian fortress-areas and at long last overreached itself in its thrust on Stalingrad. There the counter-blow found a German army that either would not or could not move, an army that allowed itself to be besieged on the battlefield. There can be no better example of my contention that in circumstances such as this the enemy must be led on to break himself up against a well-positioned fortress defence.

Another very interesting fact emerges. It is that the Germans came to a full stop without penetrating into the immensely powerful fortress stronghold of Russo-Siberia which lies east of the Urals to roughly the Yenisei River, covered as it is by that great sponge of land-space to the west, the absorbent for both land and airborne attack.

The fact that the Germans failed to break in goes far to prove my case as to the great insular strength of this area, of which I speak later when discussing new aspects of modern geography.

Throughout the subsequent great forward surge of the Russians we notice how frequently they were checked, often for months, on the cities that stood in their path. But we also notice how the Germans had laid out no real organised defended areas behind them as they went forward on which they could stop their enemy when the tide of war flowed against them.¹ Here and there garrisons were hastily thrown into towns that were inadequately prepared for a siege. Unstocked and unsupported, these isolated positions became a liability and proved fatal to a large part of the German army. They had to be fed by air, a great strain and diversion of

¹ It now seems almost certain that this failure to prepare the areas behind their armies was due to Hitler's insistence on going forward when he should have stopped, and in standing when he should have withdrawn far and fast. As I have shown, we too in Africa and Malaya were equally guilty in our withdrawals.

effort for the air forces. These are the fortifications to which military commentators gave the general term of "hedgehogs". (Clichés of this sort are dangerous things. They have the habit of conveying to some that in them lies a panacea for all military ailments. In this way we have had "boxes" for defence: we have had the term "battle group"—which meant a task force—converted into a whole tactical conception for which neither we nor the Germans, who also used the term, had ever intended it: "Jock Cols", which were only light mobile reconnaissance detachments, were aborted into some sort of decisive offensive which never decided anything. It is not the fault of those who first used these terms: it is the fault of those who abused them and turned them into catchwords.) Perhaps the cliché befogged the inflexible German brain and led it to "hedgehog" promiscuously instead of turning these hedgehogs into great fully-munitioned fortress-*areas* and inducing the mainly horse-drawn Russian army to try its hand at either passing them by or investing and assaulting them.

The Germans seem to have had little idea of the nature of traditional war. Very probably the reason was that they had not till then come up against a great army of modern standard, and had to battle hard for their victories. Theirs was an army obsessed by the idea of the offensive, and so negligent of the defensive method required to meet its own deep offensive thrusts. Now they were perplexed and unready. I consider that Hitler's Germany has by no means exhibited the best of the Teutonic military periods, in spite of the great prestige it achieved by its first spectacular and easy victories. Too often his armies sought refuge in the rigid linear field defence, against an enemy who was rising in his power of manœuvre. Seldom was there any properly organised and fully-stocked region of refuge in which the hard-pressed armies could rest and reorganise, and from which they could sally forth once more on the offensive at a time when their enemy was at a disadvantage. At least the Russians would have been delayed, perhaps held off from German soil: at the best they might have been thrown back or have been worn out by incessant

siege and assault. The Russian army trod down the German horde in the open and in isolated invested fortress-cities. Germany lost the war.

Here we can well leave our story of war through the ages. From time to time the pattern modifies but it changes to no great extent, except for periods infinitesimal in the ocean of historical time.

War is fought on a pattern of fortress-areas : sieges of fortresses : assaults of fortresses : siege trains : battles of armies of manœuvre in the field based on these fortresses and secured by them from final defeat. That is the traditional pattern. It is a war of manœuvre. If at any time we do not feel that we can fight such a war, then we know that our power of manœuvre is at a low ebb and by all means that we can use must we increase it till we know that we can fight such a war decisively and that we can also prevent our enemy from fighting it.

The one great phenomenon that has appeared from World War II is that war is fought from the interior of one country into the interior of another and not against the borders.

That is the new aspect of modern war. Within that picture the pattern will not change.

Let us keep this picture in our minds as we discuss the future of war if that ghastly spectre is again to stalk upon the earth to foul its fair face.

XII

AN INTRODUCTION TO "ICARIAN GEOGRAPHY"

THERE has been—and will be for years yet to come—much argument as to how far air transport for both passengers and goods will supplant sea transport.

I am a strong believer in the inevitability of the trends of important influences in the life of Mankind. As one looks back through history one sees how these have always worked themselves out to their final conclusion in spite of the horror manifested at their beginnings and the consequent hatred and mental, even physical opposition they aroused. Of course, it is only in the last five hundred or six hundred years that we ourselves can clearly see these new things budding and, despite the chill blast, flowering and fruiting. Dead Sea fruit they may sometimes be, but still they *are* fruit and it is only for fruit that we are searching the thick grass. Social ideas, condemned at the time of Keir Hardie, cursed and scorned when Lloyd George promoted them, are today by natural advances seen to be the common things and accepted as right and usual. The steam-engine, reviled and retarded by horse-lovers, is passing into limbo after fulfilling itself; and so on with improvements that are too obvious for their re-counting to be borne contentedly by the reader.

There are today inevitable trends in our ways of doing things and here are some of them.

Every nation urges its people to be self-sufficient. They are to be able to grow, to mine, and to make all that they need. It does not matter very much whether it is every nation or every region of nations that has upon it this great urge. What does matter is that the urge exists universally in larger or smaller communities. If we are ever perfectly organised in this world the urge will be unnecessary, but till

then it will continue. Until that day of perfection, the day of the "Federation of the World", we have to accept this tendency. We have to realise that all these little communities of God's creation will be making on the spot, from beginning to end, in so far as lies in their power. For manufacture they need raw materials but the purchase and carriage of raw materials, often today very heavy freights, entails a lot of costly effort on the part of the buyer. So we see also the tendency to synthesise everything that can be synthesised. Admittedly the synthetic article has sometimes been not as good or as cheap as the real thing. But the chemist and the manufacturer are, bit by bit, getting over these difficulties either by cheapening the processes of synthesis or by finding cheap substitutes for the raw materials.

This will go on : it will not decrease, it will increase and improve. Thus, there will be less need to lift the raw material about the world, and the more bulky and heavy the raw material the less will the would-be importer wish to pay for its carriage. So we should, in time, see a lessening in the carriage about the oceans of the bulkier, cheaper raw materials. It will be argued that the contrary tendency is also at work, that more and more material and, therefore, more and more freight-carriers travel about the world. That is true, and I think it will continue to be true, because Man's needs are without limit, but I do not think that the cheap and bulky things will go about the world in this increasing quantity or even in the quantities of today. The valuable light and compact things will more and more be carried, and increasing quantities of them will be processed before they are loaded rather than loaded as raw materials.

Then there is a tendency to improve durability and strength at the expense of weight. We may alter, as I show below, our ideas about durability but not about the strength of the lighter materials. That tendency must go on : it will not stop or go back. In this way we shall get light loads which will be much more valuable, weight for weight, than the loads of the past. Research and invention will be devoted towards reducing bulk while retaining the other qualities. So

we shall ultimately not necessarily need the great freight ships of today to carry our light, processed or partly-processed materials about the world.

Day by day Time is buying more and more of the Commodity of Space. We move things more quickly and we expect to have our demands met more speedily than in the past. This process too must go on. More and more insistent are we that what we need shall come to us at once. And it will, by the fastest possible means—luscious and fresh from the soil or desired and glistening new from the factory.

Durability is today still in favour, but there are signs that it is not to be so much in favour in the years before us. Many change their car every year for a new model. The old model goes into the second-hand market which, before the war, was cluttered up with unsaleable and unselling vehicles. In the days before us these will not be needed except for scrap. A car will be made to look nice and to go well for one or two years. By then experience is surfeited and the eye tired by the thing, and fresh experience and new forms will be needed to renew the jaded appetite. This does not only apply to cars. The brocade gown of the 17th century which passed through succeeding wills from frail form to fair is not now needed ; it has no value since the beauty's æsthetic eye soon tires. Many another thing is treated like this and many more things will be treated so. Change but not decay, for decay has no time to set in. Change and obliteration, oblivion. Light, ephemeral things being rushed about the world as fast as craft can take them to be ahead of taste, ahead of the commercial rival.

Our whole society and all our ways of life are destined to undergo more rapid changes than in past centuries. The lay-out of a city will have to change as the ways of life change. Even dwelling-houses will change in colour almost every decade. Probably only the great public buildings will be durable and so we shall return to the days of our great mediæval architects, to the days of Yevele and his brother master masons, when the public building (the cathedral or the guild hall) took all the money and the effort that was to

spare, and the ordinary dwelling-house was left as a thing of little account.

Power is confining itself to yet smaller compass. It is being derived from more and more elements as the days go by. In the not far future it will be derived easily from common heavy elements, thorium for instance. Perhaps it may yet be found possible to harness solar energy as a cheap and ready power to our hand if we can only find how it may be brought to act as we wish upon matter. Compared with the heavy, complicated, clumsy, primitive power-egg of today's aircraft, the contraption that will drive great freighter aircraft at high speeds in the days to come will be quite minute. It will take little more if any cost to lift, make buoyant and drive this huge aircraft forward through the light resistance of the air than to push the buoyant sea freighter forward against the heavy resistance of the sea.

If we were to employ light and strong materials, the apparatus to make and produce them should not be heavy as it is today ; it too will become lighter and less bulky : it too will be easier to lift about the world.

Therefore, it is well within probability that for the purposes of peace-time life the air freighter (of whatever form science may produce) will replace the sea freighter. For war there is every cause to believe that this development will be even more certain and more early. In this chapter and in the next we shall see that *it is mainly the airborne force and the airborne reserves that will be needed in order to prosecute an offensive campaign. Further, in war, time is the one and only war commodity that we have to consider.* It means everything—that the weapons are there in sufficient quantity and up to time ; that they are ahead of our enemy's weapons ; that we can move and operate more swiftly than he can ; that we can concentrate more swiftly : indeed, that everything comes about to allow us to be there first with the most and the best.

The future of war is airborne and not seaborne.

The late war, elementary as it has been, has shown clearly that Sea Power cannot live in the same war world as Air Power. If any nation goes to war with its transport and its

forces designed to run along the surface of the seas, it will die and will die for ever.

It would seem that in due course, air transport will oust sea transport both in peace and in war. Already in the wild regions of Assam and Burmah its economy over road transport, particularly in the vital military commodity of Time, has in these conditions been demonstrated. This is at least significant, for we are only at the beginning of the history of air transport.

In further support of my conclusions here are quotations from an address given by Air Vice-Marshal A. C. Collier, C.B., C.B.E., Deputy Commander-in-Chief of Air Transport Command, speaking at the Royal United Service Institution, Whitehall, in December, 1944 :

Other advantages of air transport are related to its speed of movement. By saving time in movement it reduces vulnerability and ties up fewer highly trained personnel and less specialist equipment in transit.

* * * * *

It is inevitable that at this early stage in the development of air transport the striking advantages which I have enumerated should be partly offset by certain limitations. Pessimists regard these limitations as ones which will always apply to it: *enthusiasts, among whom I include myself, are confident that future research and development will reduce or banish existing disadvantages.*

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There is another apparent limitation which is more imaginary than real, but which is often allowed to weight the scales against air transport; this is the fact that it is more costly than surface movement in direct manpower employed for each ton lifted. This is, however, often outweighed by the military or *economic value* obtained by the *rapid movement* of the cargo.

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In due course, however, in peace as in war, the value of the time saved will become clearly recognised and air movement will be valued on its true merits. The adage "Time is money" is much more true than most of us realise.

The italics are mine. I agree fully with what he has said. These are inevitable trends against which only the very blind will struggle, as inevitable as the coming of railway trains from the invention of steam, and of tanks and aircraft from the petrol engine.

Believing as I do that the conquest of the air and the conquest of space by radio have cut the sequence of history in two, and that the graph of development which has till now been one of an ascending curve must be suddenly taken upwards in a vertically straight line before it can level out again, it seemed to me necessary to apply this conviction strategically, with a vision before us of the world as a whole. Perhaps it is true to say, since the history of the world is so made up and has been so changed by these periodical clashes of war, that the strategical factor must be regarded as predominant in the moulding of the world's future. If it is so, then this means the final self-damnation of Humanity. But it is worth considering whether it has not been predominant in the past, sad as it may be to accept such a conclusion.

I hope very much that we shall be told before long how far Haushofer's Institute of Geopolitik, in its Teutonic interpretation of Mackinder's theory of domination by the Heartland of his World Island, was responsible for the launching of Hitler's Germany at Stalin's Russia. Founded by Hitler about 1933, a pseudo-scientific establishment, this Institute has debased the study of political geography as we knew it from Montesquieu, Turgot, Vidal, and lastly from our great geographer, Sir Halford Mackinder. Mackinder's study of political geography first appeared in the early part of this century. His book, *Democratic Ideals and Reality*, published after World War I, was remarkable in its wide sweep. Examining geographical influence on the struggle between the

seafarer and the landsman, the nomad and the ploughman, he concluded that if a sufficient population were to occupy the lands lying from east of the Yenisei River in Siberia thence west to Poland, north to the Arctic and approximately to what is the southern boundary of modern Russia, then that people would be the most powerful people of the World Island, the inhabitants of the Heartland. The World Island he envisaged is the great land mass of Europe, Asia and Africa.

Did Hitler think that by transferring his Teutons to that Heartland they must, as a matter of course, become the Herrenvolk of the World?

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The geography that all of us were taught and the terms in which we speak is a seafarers' geography. Even when we speak of air power and of air merchant-fleets we still speak in terms that the mariners used and handed down to us; and by habit our minds assume towards geography an attitude that is traditional and without realisation of much that lies behind the geographical terms with which we cover our subject. A new attitude, even new terms, are needed if we are to understand what the future holds for us.

The most satisfactory approach to the new geography is for us to imagine ourselves in a world in which flotation on the sea, on any water in fact, has never yet been achieved; in a world, that is, in which nobody and nothing can float on water.

Then we must imagine ourselves in a world where, while nothing floats on water, yet for three thousand years craft have floated through the air. At first, primitive craft which hugged the land—"coasted"; with short range and at the will of the winds. Later, highly specialised long-range craft—ocean cruisers, with oil propulsion, which drove them whither they wished to go despite the elements.

Everything moves by land and by air: nothing can move on the surface of the seas. Broad rivers can only be crossed by land vehicles when bridges are dropped from bank to bank by airborne engineers.

There are land armies and air fleets and airborne armies : there are no sea navies, no seaborne armies.

That is the world, the planet, that we are to conceive as we read this chapter. Let us call our planet, ICARUS. The early Icarian geographers will have spoken of Asia and of Africa, perhaps not of America. Today, with our enquiring minds, we Icarians encompass the whole world and are urgent to be intimate with other worlds.

The need to build light things for air freight : the need to put everything possible into the air owing to the cost of time and money in land carriage and in the frequent changes that land carriage must make into air transport in order to cross the narrow seas : the desire of each nation to industrialise itself—these things will have led to the processing of heavy raw materials *in situ* into the finished article before loading it into freighter aircraft. The air is full of great cargo ships but the surface of the seas is empty. The seas are deserts. They are even more inhospitable than the sand deserts, for an aircraft that descends on the sand will be rescued : an aircraft that descends on the sea goes, with its crew, passengers and cargo, to the bottom like lead and will never be salvaged. In peace, this inability to float on the sea does not matter so much, for aircraft are very reliable, but in war, to be caught over the sea and shot down is a terrible disaster.

There are two results from this.

The first is that a string of small lands such as Great Britain, the Faroes, Iceland, is an isthmus connecting Europe with North America, for the short strips of sea between them are only bits of desert to an airfarer. The wide seas on the flanks of the isthmus are wide deserts. These small lands are not islands : together they form an isthmus, for they possess air harbours and are hospitable. To an airfarer at 700 m.p.h. the time in flight between them is only a matter of minutes. Indonesia also is an isthmus between Asia and Australia.

The second result is, that in war one will seek to preserve air routes by passing them over land, even along an isthmus, or by keeping them far away from one's enemy. By passing

over the land they get protection from land-based air defence as well as a chance of rescue if shot down.

Little lands that are far out in the sea desert and distant from each other are oases to the airfarers. So the sea-islands of the mariner have never appeared to an airfaring world, but other islands have appeared in their place. Let us see what these new islands are.

I think it was Francis Bacon who said that his seafaring England could take as much or as little of war as she wished. How could he say such a thing? What was the particular genius in an insular position that placed England so favourably in his day, and why is her position today in our semi-Icarian world so much less favourable? Britain rose to greatness, so it is fair to assume that the mere geographical fact of insularity has some natural power of its own for war.

To have the advantage of an insular position, as Bacon saw it, the borders of the land must not be penetrable by land forces. In the Icarian world, those borders must be either wide seas or mountains (marshes are too rare to consider). In the seafarer's world this degree of security would have left the island people free to go about their ordinary occasions within the island, undisturbed by war outside, and to work freely and fully towards the prosecution of the war. In the Icarian world that degree of security is not enough. Without comparative security from the airborne army, which will be launched from above into the interior of the island and not against its borders from outside, the island people cannot prosecute the war without interference. The great advantages of prosecuting a war undisturbed inside the homeland are that the war effort reaches its highest by stages giving the greatest efficiency, and that the undisturbed people feel the strain of war less than the disturbed, and so can last much longer and, after the war, recover more quickly both spiritually and materially.

The first quality, then, is a sufficient measure of security from disturbance. For the Icarian island this means a sufficient degree of security from the land army launched

against its mountains or wide sea borders, and against air-borne attack from above on to the face of the island.

A country of great industrial strength—and only such a country is worth considering for modern war—will have both a good agriculture and good level spaces for its industries and its internal communications. Such a country presents inside its borders—that is, on its face—no geographical features that will in themselves form an obstacle to airborne attack from above.

Thus the obstacle must be a man-made obstacle. So now it is important for us to realise *what are the man-made obstacles to airborne attack. They are the anti-air-attack defences. These may be within the island itself or they may be in territory belonging to or friendly to the island and lying outside the island borders.*

In Bacon's time, England and other powers of her day were self-sufficient for war. Imports were a luxury of peace-time commerce. In this state England fought her wars and won them, and her sea fleets grew apace until she ruled the seas. As the needs of the war machine multiplied so did England's insular position work against her, until her seaborne commitments in war were beyond her means to meet. Her power was built up while she was self-sufficient for war. Secure inside her homeland, and with few or no liabilities outside, she built up her power. The impetus of this preparation and her great prestige carried her on in some safety until 1914. From then onwards she has fought her wars under the almost insupportable strain of her open sea routes.

England's navy, in the 16th century an economical defence and outpost force, has long ceased to be a strength. Of late years she has been compelled to maintain in war this huge armoured fleet in order that she may secure the long threads of sea communications that span the world, threads by which she has the misfortune in war time to be forced to live in order to fight. Our navy is now a dangerous weakness to us, a weakness that, owing to the misuse of German air power in World War II, was not fully brought home to our nation.¹

¹ It follows from this that Great Britain can no longer be responsible for the defence of her Dominions. The truly economic weapon of defence,

The genius of an island is security in the homeland, and self-sufficiency for war is the first part of the security.

Defence of the homeland against airborne attacks is achieved in a manner similar to that which an army adopts to defend vital areas from enemy incursion. That is to say, provision is made to get warning of attack and if possible to know of the weight and direction of attack. There must be plenty of depth outside the probable enemy objectives ; and against airborne attacks which may come from almost any direction, the depth must be all round the objectives. There must be an outpost system : that is, a system of light defence thrown well out in all directions, which will take toll of an enemy's leading formations, gain time for the defence to put its plan into effect, blunt the point of the attack, determine its direction, and mislead it. Lastly, there must be defence in depth about all these objectives. If all these needs are satisfied, then we have a sponge-like defence which will absorb an enemy attack. Thus the second necessity for security of the island is depth all round its vitals. Therefore, the vitals will not be placed near the land borders.

Napoleon has said that fortune favours the big battalions. I would say, in our context, that in the planet of Icarus fortune favours the great land-spaces and frowns on the small ones.

Finally, there must be the great air fleet, which can concentrate and go forth to give battle and defeat the enemy in the air before he reaches the island's important land areas—if possible, before he crosses the borders. The third necessity for security is the possession of a hard-hitting counter-offensive air force.

Depth can to some extent be afforded by a wide ocean area, for an enemy who crosses such a desert by air finds himself at the end of his fighting power when he most needs his strength to fight the island defenders. But the sea desert area is not a good area for getting warning of coming attack, so that this her fighting ships, is no longer effective. Each Dominion, or each "region", must be able by itself to defend itself till the whole strength of the Commonwealth can be mustered to its help. Let South Africa, Australia, and New Zealand take heed of this for if ever there is no effective international organisation to keep the peace, their danger is the greatest.

form of depth for defence may be said to be only of real benefit where it fulfils the purpose, by its great extent, of tiring an enemy attack before it reaches the island's land shores.

Now we can summarise those strategical properties that go to make an Icarian island, the island of land and air warfare.

It must be self-sufficient for war, or as nearly so as is possible today and in the foreseeable future.

Its land borders must be mountainous.

Its land-space must be of such extent as to allow a great depth outside its vital war-supporting areas, in order to give time to actuate the defence, information on which to act, space to wear out the attack. Oceans of adequate extent may be accepted as giving depth. Narrow seas are no borders to air power. Friendly countries may lend depth to the defence.

It must possess hard-hitting counter-offensive air forces.

Let us take an atlas and see where such islands are to be found.

Let us examine certain seafarer's islands of today and see how far they have the properties of Icarian islands. We will only regard those that have, or will have, a fair-sized population and a reasonable industrial strength, such as the British Isles, Japan, Australia and New Zealand.

None of these is within reasonable distance of being self-supporting for war. For one thing all lack oil. All are true seafarers' islands so far as their boundaries go, but only one is an airfarers' island in that respect—New Zealand. The British Isles and Japan are parts of Icarian Europe and Asia respectively, for the sea deserts that divide them from their continents are insignificant obstacles. Australia is linked to Asia by a wide Icarian isthmus of important and productive land. It is not insular. New Zealand is divided from any considerable air power by over a thousand miles of sea desert between her and Australia and by many thousands of miles in all other directions. New Zealand is an Icarian island, and New Zealand alone of all four. Greater air range may yet in years to come attach her to Australia as a peninsula of that land mass.

The outer seaboard of Japan marks the edge of a wide peninsula thrown out from the Asiatic mainland, a part of

Manchuria and Siberia. Similarly, Australia is an Icarian peninsula of Asia protruding into the Indian Ocean and Pacific Ocean deserts. The British Isles are a part of the Icarian isthmus joining Europe to America by way of Faroe, Iceland, Greenland and Baffin.

There is no need to take the matter further : of the seafaring islands New Zealand is the only Icarian island ; but for war purposes she lacks so much to make her self-sufficient that, even if she had a large population, she could only be described as one of the lesser island powers.

Can Great Britain by any means once more gain the advantage of an island power? To the west she is secured by the broad sea desert : to the north-west there is the narrow isthmus to Greenland. Greenland, except for small oases, continues the desert area. By remoteness to the north, north-west, west and south-west, Britain has security by virtue of the great sea deserts. To north-east is the mountain barrier of Norway which, as a neutral, failed her in the last war. Due east there are the open narrow sea deserts of the North Sea and the Baltic, with the flat lands of Denmark, Southern Sweden and Northern Germany. South of the flat area is the mountain belt—the High Tatra, the mountain mass encircling the Czech peoples, and the Alps from Vienna westwards to the Pyrenees. These mountains and the mountains of Norway are the natural eastern and southern land boundaries of Britain-in-Europe, the Icarian island. The gap in the defence lies from about latitude 60° to about latitude 52° —that is, Southern Sweden and Northern Germany. A friendly allied Poland and Sweden would form the sponge of defence needed to tire out an enemy airborne force before it reached the British vitals. These vitals are well placed naturally. They are in Western Germany, Lorraine and North-Eastern France, in Belgium, and in Britain herself. Whether Germany, for the defence of Britain, must extend her frontiers to the Tatra to cover the Moravian gap, or whether the holding of that gap by Poland gives a better strategical guarantee, is a matter for detailed consideration.

It is certain, then, that for the restoration of Britain's insular

power she must, in the Icarian world, take in Norway, Denmark, Germany, Bohemia, Austria and France. This gives her the depth and the land-space that she needs for her security. May this not be the Commonwealth of Western Europe as one integral national unit, the Island state of Europe? Would this not also solve the delicate and very difficult problem of re-educating Germany and keeping her from making war?

In great measure, with a population of more than one hundred and fifty million people, and with the added resources of these land-spaces, this Commonwealth would be self-supporting. In so far as it needed to bring supplies for war into its western borders, its air supply routes from North America would be perfectly screened by this Icarian island, and thus remain secure so long as the U.S.A. was not hostile. Its air-supply routes from the east would cross Africa, protected into Africa by the Indian Ocean unit of Empire, with the great air base of India as the central power.

In the Icarian world Great Britain can once more become a great island power, but she must become "continental" in mind to be so.

Applying the same tests we find that Icarian India is insular. With much of her industry concentrating towards Calcutta she needs a protecting land-space to the south-east. Burmah should supply this space.

Insular India has a great chance of being self-supporting; she has oil ¹ and other varied raw materials. She is virtually a complete unit. She cannot, however, with the broad Australasian isthmus to her south-east, afford to ignore the possibility of a hostile air power controlling that isthmus and entering Australia. India should therefore extend her air boundaries to look in on that isthmus, and have airfields in Indo-China and the Philippines, thus leaving only the Pacific oases by which an invader can approach. Incidentally, this would procure for Australasia many of the benefits of insularity. The greater Icarian Indian Island extends from the Philippines to the Persian Gulf. Within the British Commonwealth she must extend her power further north-west

¹ Burmah is a part of insular India.

into Africa, in order to keep the Indian Ocean routes well back from a possible enemy. India is the natural air transit centre of the East. If India is fit for her destiny, she is one of the coming island powers of the Icarian world.

If our tests are the right tests, then there is little difficulty in naming the other rising island powers. Here, there is not space to examine further. Some of them are certainly land-locked by mountain land borders.

It is of interest to note that geographically, Icarian America is not separated from Icarian Russia by the Bering Strait but by the mountains of North-west Canada and Alaska and those of Eastern Siberia. There are many other aspects of the air-farer's geography that need an examination which we cannot give to them in this limited space.

Now we must come down to earth again. We still have cargo ships on the seas, and troops are carried about those seas in transports. The planet Icarus is still just round the corner of the sky. But what difference does this make to our Icarian geography? Today, in war, ships can go wherever they can be covered by air power or are remote from enemy air power; where they cannot be covered they cannot go if they are within range of effective enemy air attack. Thus a greatly superior air power would launch land armies in surface craft from Manchuria and Siberia on to a hostile Japanese coast, just as Britain launched them on to the Norman beaches; thus the narrow seas are today almost a continuation of the land for air-cum-sea power. That approaches near to the Icarian theory, which ignores the narrow seas as an obstacle to movement.

As most of the trade of the world goes by sea, then most of the trade of the world is forced into certain passages such as the Mediterranean, the Red Sea, and the many straits of the world. Air power is directed to blocking or keeping open these narrow waters. They orientate air power. Thus sea-borne traffic makes for an inelasticity which the Icarian world of air fleets would find irksome. Ports on the edge of the sea dot the world. Some British ports are today insecure owing to their small hinterland, and so lack local air defence

and depth for defence. Gibraltar, Malta and Hong Kong are examples. The situation of the first and the last in nuclear war becomes impossible.

Narrow waters are almost entirely under the control of air power already. The Icarian era has entered them. As air power increases in range so will the ocean spaces enter the same era. Cargo ships will not be supplanted by air freighters for many years yet so air power must be disposed for and applied to the protection of seaborne traffic in both narrow seas and ocean spaces. The less that air power need be so diverted the better, for it strains our resources in war almost to breaking-point. Therefore, in all future Commonwealth planning and international understandings we must try to arrange our land masses geographically so that they cover these sea routes most economically and are, moreover, so placed as to screen indirectly, with our main air effort, the operation of our air routes. In war it is the land masses that are of greatest value, for air power gets its sustenance from them: the ocean spaces, wide sea deserts, with their open sea traffic are becoming a grave weakness. The possession of more ports will not protect sea traffic; only the possession of considerable land masses from which great air forces can operate will protect this traffic. We are entering the Icarian era and must even think of a world to come in which no ships at all will furrow the Seven Seas.

This is only an introduction to the subject; in the airfarer's geography much remains to be examined and much to be said. For example, if there is to be a Western European Commonwealth, the strategical geography of its dependency, Africa, needs close study.

It will repay examination to study shortly the African dependencies of the Western European powers.¹ For instance, the north-western littoral of Africa is a part of Europe (MacKinder's theories seem also to indicate this fact). South of an approximate line from Northern Abyssinia to Senegal, Africa seems as though it should be geographically and strategically one unit, but today it looks as though many, many years will pass before it is unified economically and racially. Its

¹ It will also pay to make the same examination of Indonesia.

unification is, apparently, in the end inevitable, so perhaps there would be no harm in setting to work now to hasten it on slowly. It would be encouraging failure to try to cement together peoples who have not the same way of life, or at any rate a way of life which bears a fairly close resemblance and is, at least ethically, founded on the same principles.

We have mentioned that there are other natural "insular" countries in the world besides India. Between the Yenisei River (actually, from somewhat east of it) to the Ural Mountains¹ and perhaps including the rich area about Kuibishev (the old Samara) there lies another region of what should be great "insular" power. To east and west are mountains and land space, to north the Arctic, to south the mountains that border India—the Hindu Kush and Elburz. The region abounds in minerals and has much oil. Agriculturally, they say it can be greatly developed. If it can be populated and made self-supporting for war, then its insular position is of tremendous strength. It should be remembered that it was from the western lands of this island that Russia took off in the attack that drove the Germans from her soil.

There are yet other insular areas in the world. The currency of Time will, as the years pass, purchase more and more of the commodity of Space. So let us regard these Icarian Islands as each one not more than a great fortress-area with its constituent fortresses within that area. They are thus no greater today than yesterday were the fortress-areas about Brussels and Lille, or about Paris and Rouen. The scientist of war now has his problem before him—it is to discover the swiftest means of reducing and capturing any of the fortresses that he may select for his problem.

The soldier should now combine in his mind two things :

That war now takes place from the interior of one country into the interior of another and not against the borders.

That nuclear energy, propellants and explosives are now a normal feature of war.

With these two things a military scientist will study and solve the problem propounded in the Icarian Geography.

¹ There is uranium in the Urals.

A responsible modern soldier must be a competent military scientist.

Cast your eye over a globe of this world on which we live and suffer so much, and search out the areas that have or will have insular power such as I have described. Ring them about with a soft pastel chalk. Tilt the globe so that you are looking down at the Arctic with the northern hemisphere seemingly around it and observe what pattern the insular areas make : which is at the centre and which on the periphery. With these areas in mind and imagining that the next and last World War has broken out among them, and is to be fought in the traditional pattern with airborne forces as the army of manoeuvre, now read the next chapter.

Time has eaten up Space so we must once more recollect that the Russo-Siberian insular fortress is no more than one of those fortress-areas of Northern France of which we have written. The Indian insular fortress is no more than the fortress-area about Lille, Namur, Brussels and Antwerp. Thus do these two insular fortress powers face each other.

XIII

NUCLEAR ENERGY AND WAR¹

ATOMIC power has been applied to war. It was not unexpected that it should come, but perhaps it came a little sooner than some anticipated. The bomb was certainly detonated before the world knew well what it meant and how far its effects would be felt now and in the future. It had to come and it has come. It represents one of those inevitable trends of Humanity in our eagerness for that elusive thing called Progress.

In bursting, the bomb destroyed great areas of buildings and thousands of living creatures. It will not have destroyed the soil, except perhaps in insignificantly small areas nearest to the point of explosion. Although radio activity will remain in the area for some days after the explosion, it now seems pretty certain that no chemical or radio activity is left permanently in the soil or in the neighbourhood. Thus all we have, and perhaps that is enough, is complete devastation over a great area of the surface of the earth. The bomb was the first of its kind and undoubtedly a very primitive affair compared with the better and bigger one of the future : it was also slowly and clumsily lifted in an aircraft, not necessarily the most efficient means of carriage to the scene of action. Before us, some years ahead perhaps, lies a period of warfare in which the atomic bomb will be hurled far up into the stratosphere by very swift rockets, predicted or radio controlled, and will fall pretty accurately where it is needed, a thousand-or-two miles away. *Its effects will be scores of times greater than those of which Japan was the unlucky witness.* Thus in a short space of

¹ The views I express here are based on such information as I have in October, 1945. For me they form a "yardstick" by which I may be able to assess the value and effect of each piece of later information that comes to me. Perhaps they will be of the same use to the reader.

time a number of these rockets which we have as yet no good means of destroying in flight will create a desert over thousands of square miles of country. The greater the land-space of the country, the longer it will require or the more rockets it will require to devastate it. A little land will be quickly dealt with.

In the ordinary course of events the production of all forms of nuclear and similarly destructive power will eventually cheapen. It has happened to every process so far, and it will happen now. Quite poor countries will be able to produce some sort of nuclear energy for their own use. It appears, for instance, that we may one day be able to set up the same energy by using thorium instead of uranium. Thorium is found in the sands of Southern India and in many other parts of the world. It is a common heavy element, and so the process is cheapened, and becomes cheaper still whenever we find some reasonable manner of producing its energy. The actual method of production should also become simpler, therefore the present state of affairs in which Russia, U.S.A. and the British Commonwealth alone have the productive power to build these terrible weapons cannot last very long. Today the aeroplane, tomorrow the rocket, the invisible attack. The devastation of the surface of our earth will be a simple thing. The fertility and the achievement of men's brains and hands, which the ages have nurtured in spite of man's open-eyed follies, will disappear in the short space of one moon. At present it seems that we cannot utilise the atoms of some light and ubiquitous element that we could set off on a universal journey of destruction and so send our own world up in smoke, a minor stellar spectacle for other planets to chalk up on their tablets for future astronomical history.

In the past we have seen nations go to war in order to take parcels of useful land from another, to attach useful populations to themselves, to occupy a territory in the hope of making the indemnity, the reparations, pay for the expense of the war and yield a profit. Of late years we have seen how fruitless it is to expect the indemnity from a hard-fighting and finally crushed nation to pay any but the smallest part of the cost to the

victor. We have seen the victor himself further impoverished by loss of the purchasing power of the conquered. That is a normal tendency now in the making of war. Thus, in that respect it is working out to its logical conclusion. Germany and Japan are so weakened that their power of ever paying off any appreciable portion of what the other nations have expended on their account is negligible.

A war in which nuclear power is used for destruction will reduce to nothing at all the ability to pay. It will not only be the material loss but the wholesale destruction of the beings who work, both by death and by nervous exhaustion, that will cripple the ability to pay. Thus the victor will never in future get any return payment from a vanquished country. If he intends to occupy the land, then he occupies a desert, an area that will need all his own resources for years to come in order to make it anything of value to himself.

There is therefore nothing material to be gained by war. So why, in the name of reason, ever go to war? Why should there ever be a *casus belli* that makes war in these conditions worth while?

If we do not go to war, are we going to use the threat of this destructive agency for super-power politics? I cannot think so, for at some time or other one nation will certainly call the bluff on its neighbour and will call it mistakenly. Then there will be war. Surely we all see that this is the inevitable result of using that threat when most nations have a good knowledge of, and the resources for, producing nuclear energy.

Mankind is, I suppose, incorrigible. I do know, as I have pointed out before in this book, that there are many nations not fit to enjoy liberty on account of the way in which they will abuse it. Germany and Japan are two of them, and there are others. No nation that has not a national conscience is safe for the rest of mankind, and only the democratic way of life develops a national conscience. For a nation to be able to run a democratic government successfully, it must be a temperate nation, not swayed hither and thither by its passions, a nation of reason that springs from a good ethical foundation. What nations in the world are like this? Few indeed. So for

decades yet there will be irresponsible nations and there will be the threat of war—nuclear war—for generations yet to come. Some nations seem to have a natural liking for war : they are in love and in league with death. It is no good shutting our eyes to the study of the science of making nuclear war, for if we do shut our eyes we shall not be able to prevent it, and we simply must take every course in any way possible to ward off this cataclysm.

If, as seems true, it is only the democratic way of life that is safe to the world, then those peoples who are not democratic are no more fitted to know of or to handle the weapons of war than a lethally-minded small boy is fitted to handle a rook rifle. It is not safe for the rest of us to entrust them with deadly weapons, not safe to give them the very latest and best discoveries of nuclear energy, if these discoveries are to be bent to evil purpose.

It seems lucky, then, that the nations that are nearest to the democratic way of life are the nations that are today most advanced in research into and in production of this new energy. It is also fortunate that for a little time yet they need not part with *all* its secrets or *all* the latest discoveries unless they wish to do so, and then only to those people whom they regard as fit to enjoy the benefits without using the power thus acquired to force their will on weaker nations. So the policy seems quite clear that these nations must put great efforts into the development of these energies and must spend great sums in collecting to themselves for research all the best scientific brains in the world. They must not part with any secret information or new device to any nation that is not fitted to receive it or that cannot be trusted to safeguard it for the required time. If it is not possible for these nations to keep their newest secrets for a sufficient length of time, then the irresponsible nations will lay hold of them and there will be another war.

There are many who tell us that it is impossible to safeguard such secrets for an adequate length of time. There are others who say that only by giving to all nations at all times all we know of this development can we ensure that they do

not work in secret to develop their own nuclear power for war. To the first suggestion the reply is that in that case the irresponsible nations will get hold of what they cannot beneficially use and there will be war. To the second, that to have released the secret to Germany or Japan—had it been known—in 1938, would simply have handed to them the means to destroy us all and they would have used those means just as they wished without ruth or shame. There are other Germanies and Japans today : the world has not yet seen the last of them. Although the scientist Bohr came from a highly-advanced small country there are other small countries which are not so well advanced and which may yet possess physicists as good as Bohr ; there are larger countries which may possess many Bohrs and yet be still irresponsible.

We can never appease some people, no matter what we give them : they will demand more, and if they do not get it will go to war to grab it. They will demand more and more information about it, and more and more raw materials for this new world force, and in the end will fight in order to get them. Irresponsible peoples do not think much before they act. They are moved by passions and greed alone. Did the Germans ever wait to think that by making war they might well cause it to be made on them and so reduce their country to a wilderness ?

So we must sorrowfully face the possibility of nuclear war. I do not doubt that once more it will soon be the fashion to prefer all sorts of specious excuses for the Germans for making this last war, thus encouraging some other nation to find similar excuses for making the next. We are very foolish in the way we offer our advice to such peoples as to how they could best plead their evil cause.

How, then, will war be fought ?

Hereafter, I am not concerned with the moral aspects or the advisability of using this new energy for imposing one's will on the enemy. It must, however, be stated emphatically, that much as a British soldier may talk or write of war he loathes it more than anyone else, for he now knows it better than anyone else. He must study it, for it is he who must be first pre-

pared for its horrors and endeavour to prevent its occurrence. Let us regard our fighting services as the preventers of war rather than the makers.

I emphasise that education in peace time is the prime commodity of war. From it emerges the research, invention, imaginative and creative power of the nations' war organisations. *The fighting forces must be founded on a broad basis of education of a much higher standard than that of today. It follows that our staffs and our commanders must be of a different quality from those whom we have been used to employ.* I do not contend that these men must be civil scientists themselves, only that they must be true military scientists possessing active intellect and enquiring and seeking minds, interested in all those sciences which are now so closely related to the business of the soldier. A military scientist is a soldier of imagination who has critically studied war through the ages, and in studying it has come to know its process, its evolution, and its full meaning. With that knowledge he must fit the results produced by the civil science on to his studies and so derive his opinions of war's future. Informed imagination is henceforth at a premium in our fighting services.

It is all the more necessary now that we should possess such men in quantity at the head of military affairs, for there is no time to be wasted, not one instant of time. Science has got us under control and Providence alone knows for what we are heading.

As I see the problem at present there seems to be no chance of our ever being able to limit significantly the explosive effect of a nuclear bomb that detonates on the face of our country. With the high explosives of yesterday we could localise the explosion to some extent, though we must admit that with the arrival of the ten-ton bomb we were past the limit of what was practicable in the way of artificial surface protection such as concrete. Already we had had to go deep down into the earth. But we did find that even with our heavy bombs a quite considerable amount of German surface industry (including the operatives) was unscathed or repairable. *With the atomic bomb none will escape.* There is no other apparent means

than this great depth of earth by which we will be able to avoid the effects of nuclear fission. It seems impossible to counter it by absorbing the effects of the release by some other form of nuclear "blanket", since the effect of the explosion is of immense pressure and of intensest heat; all we can expect is some means of minimising somewhat these two activities.

Thus the problem appears at first sight to be little different from the problem of minimising the explosion of high explosive, but the size of the problem will be going up by almost astronomic proportions. We have not only to limit a pressure of some million atmospheres and a temperature of about a hundred million degrees, but in addition we have to protect human beings against the direct effect of gamma rays. There will be no surface protection against these combined forces.

The only safe place tomorrow will be below the surface of the earth. Since war will come suddenly, without a second's warning, by the arrival of the first great salvo of atomic rockets, and since it will soon be followed by airborne bombardment and invasion if the main softening bombardment is seen to be successful, then it is certain that in all times of peace we must tread this earth quite ready for war, and live *inside* it quite ready for war. If we are really to be quite ready, then all necessary means of living and all necessities for carrying on the war must be kept below the surface of the earth. Thus, since nuclear bombardment (and other kindred horrors yet to come) will prevent the tilling of the soil on a considerable area after the crops have been obliterated and after every surface reserve of food available to the area is wiped out, great stores of food must be kept below the ground and means must be ready there to produce more food by purely chemical methods.

The size of the food stocks to be kept must be enough to last out the war, supplemented by whatever food stuffs can be brought during the war into the area selected for attack and those it seems will be fairly limited. They certainly will not come by surface ships, for ships will not live on the waters or ever make port against widespread nuclear attack by rocket

and aircraft. Stocks of food may possibly come in by submarine ; but even that is unlikely, for submarines must at some time surface in order to discharge their load and some time they must make port. To avoid these handicaps we might be able to bring these craft by submarine channels into subterranean harbours by one means or another, but the great amount of work to cut the channels and to build such ports renders the project pretty hopeless. Foodstuffs will have to be brought by air, the aircraft dashing straight into covered passages to their unloading quays. I do not doubt that in time we will find the means to rocket supplies from the producer country into the consumer country, and that there will be means of directing these rockets into the tunnels and collecting their contents.

All that has been said here applies equally to all sorts of commodities of war that are not produced in the consumer country in sufficient quantities to last for the duration of the war. In a country of small land-space, manufacture may not be able to continue in wartime and it may be necessary in peace to store large quantities of missiles and of weapons. I have already stressed the inevitable tendency to produce everything synthetically where one may not be able to produce the genuine thing in one's own country. The nation will strive in peace time to produce the whole range of raw material, either the genuine or the synthetic article.

If in a country of small land-space we are to go underground for most occasions of peace time then it seems that only in order to enjoy ourselves shall we pass our time on the surface of the earth. In a country of great land-space we shall be troglodytes in those areas within effective range of the hostile nuclear bombardment weapons. The urban life of today with its vulgarity and noise, its jangling nervous tension is unpleasing enough, but that of tomorrow in those horrible catacombs is far worse. If we could find there even the deathly peace of Proserpine's Garden in its uncoloured calm, it would be preferable to the hellion idiocy of those underground cities and their tunnelled thoroughfares. None but a tribe of lunatics would tolerate such an existence.

Between these cities we must, in wartime, either go underground or shoot out by air.

The greater the land-space of a country the less chance is there of an enemy bombardment being able to close up the entrances and exits of the nests. However, in order to conduct one's own nuclear bombardment there must be some sort of apertures for the underground batteries to launch their missiles. It might well be fatal if these were to be closed by the effects of enemy explosives dropping close to them. So land-space is also a necessity in nuclear warfare for so much as existing during the wars of the coming age of new energies. All the more essential is it that Great Britain should acquire land-space as described in Chapter XII by throwing her borders right out into Europe. All the more is it necessary for the western Continental nations to be able to tuck their war potential well away into the United Kingdom and Ireland.

The smaller the land-space of a country the less margin has it between securing comparative safety and being obliterated. Since the effects of nuclear bombardment cannot, so far as we now know, be localised to any extent on the surface of the earth, and since, therefore, the small country's counter-bombardment weapons can thus soon be neutralised, it is a question of life or death that it shall succeed at once in putting out of action the enemy's bombardment weapons. Its great hope is to be ahead in the research and production of these weapons before all the big nations, and so, by the threat of what it can do, hold them at bay and prevent their starting a war. Therefore, a small country will always keep very powerful weapons of counter-bombardment. All this is really futile. There is only one security for a small country and that is that it shall give up its sovereignty and join a cluster of other small countries—if possible other great countries—so that it may have the land-space in which to distribute and properly dispose its potentials of war. There can be no small nations.

Perhaps there may be another way of distributing oneself if one's coasts are washed by great oceans, and that way is to sink the nuclear bombardment weapons and the industries that support them and any other essential factories well beneath

the surface of the sea. There are some advantages in being submarine rather than subterranean. It is easier to submerge the submarine installation and shift it about as needed, than to sink the subterranean equivalent, which cannot be moved about at will. We might then become to some extent a submarine folk rather than a lot of troglodytes. Perhaps from the sea we would continue our counter-bombardment of the enemy. Perhaps we will shift these weapons ever closer to his shores by moving them under the oceans towards him.

But I do not think there is any safety in the sea. By nuclear depth charge it will be easy to set up the pressure that will destroy the air vents and stave in the watertight cases of our submarine factories and batteries ; with modern means of detection it may not be even difficult for an enemy to locate them.

The areas of the earth where are big open land-spaces, lie in Russo-Siberia, China, India, America, the Middle East, Africa and Australia. So there are many large open spaces to absorb nuclear attack. Western Europe is ill-provided with open or empty land-spaces, so hope lies only in the brain-power of its inhabitants, that they will keep Western Europe ahead of its possible enemies in the production of the nuclear energies of war. It is well within possibility that these Western nations may be able to find the raw material that will make them absolutely self-sufficient in the production of energy, independent of all oil and other fuel supplies which today make power. The race will then be on among the nations who intend to make war or who fear it, centring all their activities on the discovery and application of new forms of nuclear power or of some quite new power, a better, more violent, more deadly, and more devilish weapon of death and devastation. Fortunately, it seems unlikely that cosmic rays, which may be matter completely converted into energy, can be harnessed to destroy mankind and his works, but it is possible that solar energy may yet be utilised for destructive purposes.

Starting from this point we can now get nearer to seeing the pattern of war as it would ultimately be. Almost the whole

nation is underground with perhaps some portion of the population under the sea. I must find a word for this state of affairs in land and water : I will call it "underneath".

In these "underneaths" are great stores of food and raw material needed for producing war energy. Running up to the surface at various places, at spots neatly ensconced in hills or mountains or deep valleys, are the openings by which intercourse with the surface is provided and the bombardment apertures from which will be launched the atomic missiles. In these valleys and hills Mother Earth will localise for us the effects of atomic bombardment and protect us from the onslaught of airborne armies.

(From here onwards I must avoid the adjective "atomic" since "all period, power and enterprise" will be atomic).

Thus it will be the mountain countries that will be sought after, both for burrowing into the hills and for localising the effects of bombardment. The Welsh and the Scots will at last be top of the United Kingdom. The gallant Llewellyn ap Griffith can laugh from his Snowdon mountains. War power comes from the hills : thither we English shall turn our eyes. The Himalayas may, indeed, come into their own, and Nepal may yet be a country to be courted by India instead of being treated as a poor relation.

Between the great areas of underneath industry and launching platforms there will be both underneath tunnels or ways of communication and overheard airways between place and place. Railways and roads will not be used, for trains and vehicles will be blasted to pieces. Surface cross-country movement will be too slow : the vehicles will for certain be destroyed. Only by swift air travel can intercourse be kept going : that is, in some cases by casting out the container rocket to its destination and in others by actual flight in aircraft.

The phenomenon of war that World War II has produced is that war now takes place from the interior of one country into the interior of another and not against the land borders. The war we are now thinking about is of that sort, and takes place from underneath in the mountains or underneath in the oceans. Let us confine our discussion to the mountains. It is only in

the mountains that those things, those factories and those stocks, with which we will make war, are safe. The greater the mountain areas the safer they are. I presume that nuclear energy will enable us to tunnel fairly easily these huge warrens.

I suppose that even with all aids there will still be an advantage in decreasing the range to one's target and in getting more accuracy by stepping weapons forward as near as possible to the enemy. Also, I suppose, it will still be of benefit to be able from one's weapon positions to shoot deep into the enemy positions and so disrupt his own groups of bombardment.

In Chapter XII I have discussed pretty fully the change in our ideas of geography coming mainly from the reduction of terrestrial space in terms of Time. Let us recall this very briefly, in order that we may recollect how it is applied to the position of England in the world of today, and so to Russo-Siberia and to India.

In Elizabethan days it was held that England was fortunate because she could take as much or as little of war as she pleased. It was very aptly said at that period, for with the humble needs of the 16th century for warfare by land and sea, she was self-supporting for war and during war.

But her insular position meant something more than that. It meant that she could only be assailed by land forces from the sea, so with a sizable navy she was almost immune from attack at her borders. Without friends inside the island no invader since the Norman Conquest has succeeded in putting any considerable army from the sea into the United Kingdom. So, perhaps, we can say that our island has been quite immune from land attack at her borders. Thus, if she had to fight she could do so mainly with her navy, the economical way which least strained the resources, morale and spirit of the people. Moreover, during a war she could, without any interference from outside, build up her war resources with efficiency, uninterrupted, easily and methodically stage by stage. She could thus bear the strain of a long war more easily than the harassed and ravaged nations of the Continent. Often in her history she has stayed firm in war, when other—war-worn—nations were forced to make peace, and with clear vision has

stubbornly striven on till her allies have recovered and joined her for the final blow at her enemy. At the end of the war, fresher than her allies and her conquered enemies, she could more quickly regain her prosperity. Her people, however reluctant to fight again, could invariably face with hopeful determination the prospect of yet another arduous struggle. Others might yield altogether before the threat or, facing it, make only a gesture of fighting.

But today, war from the air has entered the homeland of England and all the benefits that she had from her island position are gone. In Chapter XII I have shown that she could only regain a significant part of those benefits, but never all, by throwing out her borders to Norway, Germany, the mountains of Bohemia, the Alps and the Pyrenees. Only the mountain barrier is easy to defend against land attack : it is the best remaining land obstacle, for the marsh areas of the world are few and restricted. By thus expanding her borders she can find the land-space over which to absorb an airborne attack by bomb, flying bomb or actual armies before her vital areas are reached on the Rhine, in Lorraine, in North-east France, Belgium, and in Britain. Were her eastern borders provided as are her western with a great expanse of ocean and were they thus remote from airborne attack, then for a time yet she would not need this absorbent land-space.

If we apply to other parts of the world the tests of the new insular England of which I have just written, we come to some interesting conclusions, and those conclusions are at the end of Chapter XII. To summarise them. The area between somewhat east of the Yenisei River in Siberia and the Urals, when it is fully populated and agriculturally developed, obtains for itself as nearly as possible in these days the advantage of an insular position. It is an island in our modern sense. To the south is the "island" of India, stretching from South-east Burmah to the mouth of the Persian Gulf. Then there is the insular power of Britain in Europe and, at some later date, of Africa south of the Abyssinia-Senegal line. In the Americas there are one and perhaps two insular powers, and yet another in China, though of little strength.

I have summarised this in order to make clear the terms which I use in the following paragraphs.

If there is to be war it may break out between any of these insular powers. Let us see what course it would take. Recollect that we are here looking at a future some years ahead, not at things as they are today.

In Chapter XII we showed that it is on the mountain barrier that a strong nation can stop definitely and probably for ever the land onslaught of a powerful aggressor. The mountain barrier now assumes greater importance, for it is within its crumpled features that we can get security against nuclear bombardment. Thus, we may expect that a country with a mountain frontier will hold these mountain barriers at the passes¹ which matter, and that close behind the garrisons will be distributed its forward nuclear bombardment groups. These groups will reach out deep into enemy territory. Therefore, along with the local bombardment groups which hold off land attack, there will be two other groups: the first is the heavy bombardment group directed to reach the enemy's war potential and particularly his areas of, or factories for, bombardment, and the second to reach high up and far out into the skies to break up an airborne attack.

The actual local land defences will be sited to get the full value of local nuclear fire while defilading themselves from fire from in front and above. These local defences will therefore be tunnelled in deep. Within the defences will be the fortress supplies and munitions to last the garrisons for many months. A nation which has no mountain barrier as a frontier but has an adequate ocean frontier will seek in the first place to defend itself against nuclear attack by holding outlying fortress-areas on the ocean oases, the old Seafarers' Islands. Secondly, it will hold its own inland mountain areas in the manner explained. Thirdly, it will seek to advance its nuclear groups from the oases to more extensive land-spaces possessing mountains and from there to reach into the enemy homeland.

So we will see along the mountain borders a complete area of

¹ There are also the "air passes" to be defended. These are the landing spaces for heavy airborne forces.

fortress defences sited, firstly, to reach into the enemy's country to destroy his power of manœuvre, his fighting strength and his means to move it. Secondly, to absorb the airborne attack whether of aircraft alone or of a trooped army; thirdly, the local defence to throw back the local land attack. We like to think that within the fortress-areas could be installed a whole industry to keep the production of energy going throughout the campaign.

Any powerful state will be ready for war, and though it may have no intention, unless forced to it, of being an aggressor, no aggressor, knowing its state of readiness, will dare open this war against it with an airborne¹ invasion. Before anything of the sort—and this should be the crowning achievement of the war—can take place, it is necessary for him to subdue the defences of his victim. He will therefore set to work, by pressing his bombardment weapons as far forward as possible, to conduct a short-range and accurate bombardment of those points which he knows by the reports of agents, or by his detector apparatus, to house the nuclear defences and industries. It is this bombardment which the defender must not only resist but subdue.

For both opponents to step this attack forward, there will be the neutral mountain areas that lie between them. It looks as though those areas may be quite vital to the opening of the war and that bombardment weapons will be at once carried into those areas by aircraft unless the neutral countries which own them are sufficiently advanced in war-making to resist the incursion. In the latter case they will undoubtedly attempt to keep both contestants out of their country, but in the end they must fail. One or the other will enter and that move will be one of the first steps of the war, for on this success may well depend the ability of one of the contestants to enter the territory of the other.

The war then opens with this move. Let us give that move

¹ We must not always picture airborne forces, airborne weapons and missiles, or airborne supplies, etc. as being carried in our traditional type of aircraft. New forms of air carriage will soon develop which may in the end supersede our familiar air carriers of today.

to the aggressor. The defending nation is now subjected to a hail of both short- and long-range rocket projectiles of great power and great weight. Any surface industry that it possesses will soon be put out of action by predicted fire or even by fire launched by "indirect" observation from aircraft. Only those industries which are properly covered in the mountain and valley systems will continue to work. No railways will be running: the road system will be torn to pieces wherever there are centres of communications or difficult defiles such as river bridges. Thus, we come back to the ancient pattern of war in which the fortresses must each be self-contained, to hold for a given time. Communications from one fortress-area to another can only, it seems now, be by swift aircraft, although we may find a means of launching both passengers and freight by rocket.

So now we have a picture of the countries of the belligerents parcelled into fortress-areas, each fortress-area being a system of fortresses in the hill regions.

Industries which are on the plains and are dispersed in, for instance, the banks of deep river-beds, will mostly escape damage from bombardment but they will be very vulnerable in the end to the airborne attack. It must be admitted that if the installations which provide the life and fighting power for the people are scattered in covered positions of this sort all over a country of great land-space, then they will be very difficult to put out of action by any bombardment, even by atomic missiles. But if they are scattered, then communications between them will be most difficult over the face of the flat land, and it will be an immense labour to tunnel the many miles between them. Therefore, we will hold to our solution of putting our fortresses and industrial installations into the hill areas.

The hill fortress system will have to be produced on a suitable strategic pattern in such a manner that war industry may be kept going, that people may be safely housed against bombardment and that all the granaries of those areas that are within effective range of the probable enemy may in peace time be emptied into the great stores within the fortresses. The nation

will calculate that vast agricultural areas of its country will not be in bearing during a war. The nations with great land-space are in a better position than are the crowded countries of Western Europe which to a great extent lack this advantage of mountain terrain and of land-space.

Here we have the defensive lay-out. But with that lay-out a country will obviously never win a war. It will be able to ward off to some extent the weight of an enemy onslaught and to throw back his airborne invasion, provided it can keep its defensive aircraft in action. It should be able to do this if they are properly housed in underground garages in fortress-areas. Garages must be ready prepared to accept the concentrated force of this air power on every threatened front, so there will have to be very considerable garage areas.

For the counter-offensive the most powerful airborne forces are needed. In considering the launching of an attack or a counter-attack of this sort we have to remember that time is now a matter of minutes where in the past it was a matter of days. It is very doubtful whether any form of offensive which cannot cover great distances in a very short space of time will ever be able to grasp the opportunity before the enemy can recover his balance after a heavy bombardment. Thus the main offensive forces will be aircraft and airborne land forces, although the slowly-moving land forces will, after a very long time and after the airborne forces have at any rate achieved their main objective, come rumbling in carrying heavy bombardment weapons, heavy supplies and heavy equipment. More and more, however, it becomes apparent that the success of the offensive will depend on the almost complete mutilation of the enemy's ability to resist, for if an enemy is still left with ability to throw up a pretty strong anti-aircraft defence of the sort that we are now considering then it will be only with immense loss that the attacker can ever achieve a landing, particularly in the mountain areas which he must penetrate in order to settle his account once and for all with the defence.

The mere fact of landing in an enemy country will mean that the defender's fire, in countering the attack after it lands, will

be devastating to his own country. More than ever is it necessary to hold the enemy out beyond one's own borders and never to let him in.

We will now recapture the picture of the victim at war in this perhaps not too distant future.

His fortress-areas are resisting the enemy bombardment by putting up from as near the borders as possible the heaviest counter-bombardment that he can fling over. Rearward fortress-areas in other mountain ranges are taking part with long-range bombardment in the defence of their country. For the purpose of the ultimate offensive these same weapons are also being used.

The primary object of both defensive and offensive weapons is to attack the enemy's nuclear power of making war, by smashing at his nuclear industries and at the communications which serve them. So long as the defender can maintain his firepower so long will he remain safe from airborne attack, but until he can subdue his enemy he cannot launch his own counter-offensive through the air. Most of his fields in vast forward areas are under fire and a great proportion of whatever harvest has not been garnered before the outbreak of war will be lost. In the mountain areas, farming will continue to quite a considerable extent; but he will have lost the produce of much of his fertile plainland. Nothing will be coming in by sea to the ports, for those ports will be easy targets.

Perhaps this is a too extreme view even for those later days and perhaps it will be very many years before we can accurately launch the rocket projectile some thousands or even hundreds of miles to strike a port or to smash communications. Let us allow, then, that the more distant parts of a great land-space may be able to carry on its agricultural activities, and that by air it may be able to lift a great deal of the products into the harassed areas. But even with this a populous country will soon starve. It has no chance of maintaining a great population for long. It must either watch them die or give in soon after the enemy's bombardment has reached a height at which the country ceases to be able to till the fields over any considerable region. Apart from anything else it looks as though the issue

of the war will turn on the matter of supplies of foodstuffs, and that the war will not last long.

For war of this nature the factor of population is important. It must not be too great for its land-space and the fertility of its soil. Means of crop production which are economical in manpower are obviously of great advantage. India is in a very weak position in many of these respects. Land-space she has, but she possesses a huge population, mostly agricultural, and by tradition and custom she is to a great extent prevented from using economical means of farming.

If the war does go on, then the defender's counter-offensive—after he has subdued his enemy's defences and after he has isolated from all help from reinforcement, by firepower or supplies, the fortress or fortresses selected for attack—will be launched through the air to land on top of this enemy fortress-area in the hills. The general bombardment will continue until the airborne forces come into its danger zone at which time they themselves with their own weapons will take up the close support bombardment for their assault.

The purely land forces, it seems, will have little or no land offensive role as we conceive it today. If the aggressor were intent on passing land forces over land to the victim's mountain barrier, these slow-moving land forces would present a sitting target to the frontier "guns", especially as they filtered through neutral mountain defiles and narrow places. If the attacker decided first to suppress the frontier defences in order to invade by land, then he would have to suppress them all, for only a few "guns" with this huge destructive power will be needed to clean up the installations that feed a land-moving approach. It is hard to suppress completely all the batteries tucked away in forward mountain defences. I do not think that such a costly, slow and cumbersome method of moving an invasion force could in those days be employed at all. Moreover, in those coming days of great speed the concentration by land of an offensive bombardment group strong enough to beat down the fire of the defence should be impracticable. If I am right, then it may be taken that the purely land forces are heavily "armoured", "positional" or "occupational" forces with great cross-

country mobility which occupy and hold suitable positions and install their offensive and defensive long-range and heavy weapons after other forces have conquered the area. The main invasion will be airborne : the land invasion a subsidiary to it. Even then, these land forces will probably often be flown into position as they go forward in order to avoid loss from the enemy's land positional frontier defences and hostile populace.

The other land forces will all be airborne, even those which will first go into the enemy's underneath fortresses to rout them out and so to cap the victory and finish the war. These assault forces for the underneath will be the leading assault and siege forces.

The "positional" land formations will only be those needed to man the "guns", big and small, defensive and offensive, of the bombardment groups, both land and anti-aircraft. There will be counter-offensive forces whose business it is to destroy the enemy's airborne landings on the ground which may threaten the fortress or fortress-areas or the communications between them by air or underneath. There will be the underneath garrisons which repel penetration into the fortresses themselves.

Land armies as we know them today will be out of date.

Since it is the airborne army which leads the assault on the enemy's positions, then the defences must be softened up to facilitate the approach by air and the actual landing. That means a prolonged bombardment of the enemy's weapons in his own country. It may be expected that his anti-aircraft defences, with their huge area of destructive effect, will be strong enough to preclude flight over his territory until they are to a great extent subdued. Our aircraft will, thus, not be able to carry bombs over, or to look directly in on an enemy country until the anti-aircraft defences are in great part dealt with. This means that the first act of war is to put our opponent's anti-aircraft defences out of action by rocket bombardment, from the home country and from whatever advanced bombardment bases we are able to seize and secure : the second, to destroy his resistance to airborne attack. The latter object is attained both by bombardment of his land

defences and by the great air battle which will without doubt rage over the probably vast No-Man's-Land lying between the contestants. Obviously, in attaining this latter object one is also suppressing his bombardment weapons by one's own counter-bombardment.

Thereafter, the airborne attack is launched and the siege train follows on its tail by air : the land forces, if time admits, bringing forward under this cover their land bombardment weapons and heavy administrative train.

To fit all this into a more familiar setting we will consider insular Ruritania as the fortress of Tobruk-Gambut-Bardia and insular Erewhon as the fortress of Derna-Martuba-Mechili, without allowing the intrusion of airborne forces within this small setting.

Before the Ruritanian forces can break into the Derna fortress-area they must neutralise the fire of at least one of the fortresses, let us say Martuba. Yesterday we would have done this by getting control of No-Man's-Land and bringing up heavy guns to within range of the place. Tomorrow Ruritania might in the same way press forward to the neutral mountain areas or oceanic oases to emplace her heavy batteries. To get our heavies forward towards Martuba we have to drive off the enemy's army of manœuvre ; tomorrow we drive back his air forces, which are operating over the immense No-Man's-Land between the belligerents. In this latter battle the ground anti-aircraft "guns" will play a quite considerable part in support of their own air-fleet against that of the enemy.

We set to work to bombard with all weapons that can bear on Martuba : tomorrow we will be able to bombard from the homeland where countries lie close to each other as well as from the forward neutral positions that we have captured. (We will later talk more about war between very distant insular powers.)

As we subdue the fire of the fortress and drive off the enemy's army of manœuvre we in our turn close in with our field army and our heavy siege train moves up : tomorrow we destroy the airforces that are protecting the homeland, and as we subdue

the fire from his great bombardment groups we fly in our airborne troops followed by our airborne siege train and, if there is time, step up our land bombardment weapons.

Now look still wider. Here we have spoken of only two insular areas : imagine the day when the African insular area is a thing of international account, the Indian insular area, with the Western European insular area, North American, Russo-Siberian and Chinese system of fortress-areas also in being. Any of these may go to war, stepping forward their bombardment weapons as they see fit, trampling down the weak neutrals who lie between them, throwing their huge projectiles from the homeland into the enemy country ; flying out their air fleets for battle in the great No-Man's-Land, supported in their fight by the ground bombardment groups advanced to help them and by the huge airborne battleships, and finally, launching the airborne assault. If one examines a globe of the world one is at once struck by the fact that by far the greater part of the land masses are north of the Equator. All the great air routes of the world will pass over these lands and many of them will pass over the Arctic. It is along these routes that any future great war will be fought.*

Where does the navy come in ? It is little faster and more exposed than the purely land forces ; it can barely live at all when nuclear war becomes general and fully developed : the monitor,¹ in some form or other, may still have a place, but little else of the navy will be useful. It has a place for peacetime policing along with Imperial land and air forces ; in future nuclear war it becomes unimportant unless we find some means of rendering our ships virtually unsinkable, and their crews immune from gamma rays.

How then do our three conditions of land war fit into this new conception ?*

Immense mobility on the part of air armies of manoeuvre and the great power of the bombardment weapon, which either recognise no flank or can create a flank, have forced nations on this huge scale into a system of fortress-areas.

¹ Used here as a generic term for all seaborne carriers of landward and airward bombarding weapons.

With great mobility of air power, administration for the arm of manœuvre is becoming reasonably simple.

If and when land forces engage at the gates of these fortresses then the three conditions with which we started this book will govern the nature of the war that will be fought and of the battles too. We need to know more than I know today of the type of weapon that we intend to employ for this final drama before we can say how it will be enacted. I do not doubt that the pattern will be little different from the familiar one of the past.

It does seem that by the time the preliminary softening bombardment between two great insular areas has gone so far that one of the belligerents is ready to take the offensive, the surface of both countries will be so devastated as not to be worth habitation. Surely war of this sort can never be worth while ; if it is not, then, since the primitive weapons of today will never make a war of the future, great and irresponsible nations will constantly seek for some other manner in which to gain their ends. This other way would, I think, simply be a far more extended, comprehensive and far more intensive form of peaceful occupation of the desired country than we have known in the past—the formation of secret societies and the gradual occupation in a peaceful manner of one country by another, the absorption of its resources and the diversion of its prosperity to the country and people of the aggressor.¹ Short of making war it seems that there is no defence against this for the victim unless we are to suppose that a new League of Nations is able to prevent an insidious thing of this sort from continuing.

Just now—and for a few years yet to come—the picture of war will not be so extreme as I have painted it. We are not yet able to send great rockets over thousands of miles with accuracy enough to hit the pin-point of the town or the industry or the port. Industries suitably dispersed and well tucked in over a great land-space will still have a good chance of survival. India is lucky in her land-space, vast as it is. Air forces will

¹ Will it ever be a simple matter for the aggressor's agents secretly to plant nuclear and other "bombs" at vital points in the victim's territory and then to blackmail him into concessions or even into surrender?

remain for a time the most efficient means of taking the missile to destroy the particular distant target. So they will still carry the bomb to the target, while they and land power and sea power will still work together to press the airfields forward within close range of the target, and to press the nuclear land rocket, etc., bombardment forward to positions close enough to the target for effective fire. A war would still open with a great struggle for air supremacy, a struggle vital to the issue of the war. On it hangs everything. For some time to come, only a few nations will be able to produce atomic energy and even then it will be a laborious and costly process. Land armies of today's pattern will be used until such time as atomic offensive and defensive land fire is capable of blowing them away like thistledown. Navies of aircraft carriers, submarines, escort vessels and monitors will be needed for a while yet.

That is to say, the ways of making war in the near tomorrow will be much the same as those of today. But bit by bit fire-power will increase hugely in devastating effect and in range, and improve greatly in accuracy. Probably the atomic land and anti-aircraft defence at the borders and on the surface of a powerful country will at some future period be too strong for the land and airborne attack and for a time we will get a new sort of stalemate—the future equivalent of the lines of 1914-18—when the air power of neither contestant is able to penetrate the nuclear anti-aircraft screen in any decisive force.

But even in the near tomorrow life will be almost impossible on the surface of the earth, for only a few big nuclear bombs will suffice to flatten out great areas and devastate the fields. A war cannot go on for long like that: starvation will end it.

The final period will come in the days when the war of manœuvre will once more flow like rivers of molten lava across and across the earth, patterned by air power and tremendous bombardment.

The whole nation, a great part of the world in fact, is determined that there shall be no more war. I hope that I have shown that in spite of this there are irresponsible nations who may yet seek war, and that *all* the secrets of nuclear power must not go to them until it is safe for the others that they shall have them. The conclusion must be that the democratic powers

shall hold this great power for war in their hands until such time as other countries shall have constituted for their own government a fully-fledged and working form of democracy.

For our Commonwealth we now need some body of mixed military and civilian experts to work out very completely exactly what types of weapons and types of units we need for our land and airborne forces. An objective study is sorely needed to determine the nature of our fighting forces, sea, land and air. It is therefore of value at this stage to show in general terms how we should expect them to shape in future years. Perhaps we can now start to adjust them towards their final pattern.

From these pages we have come to certain conclusions which give us a reasonable clue to the changes we must expect them to undergo. We know that war tends now to be fought from the interior of one country into the interior of another rather than against the borders. From that we find that the fighting services must also tend to gather themselves back into the country rather than to go out on to the fringes, so to speak. War fought from the interior in this age of such sudden and dire onslaughts must perforce be offensive war, for time does not admit of anything else. All depends, as we have insisted, on the national ability to fight a more terrible offensive war than can a potential aggressor. That war will be fought from a great national base within one's own country: the small areas outside the base will be of little use in this war, for very soon they will be impossible to maintain owing to their lack of land-space and probably to their isolation and consequent devastation.

War is truly national, so the fighting services in peace and war come more to be a part of the nation, while the nation in its turn naturally tends more to be a part of the fighting services, not because it adopts the ways of the fighting services but because the ways of the latter become similar to its own. This is national war as we have not hitherto known it. A symptom of this evolutionary process is the coming of atomic energy. Here we have a unique energy which is for war both propulsive and destructive and for peace, propulsive, all

in the one innovation. Progress in the peace-time research on and in the use of this source of energy can but increase its power for war. It is, as I say, symptomatic of the coming age when the nation and the services are all one in peace and war.

A wealthy nation is a powerful nation both in its influence over peace-time international policies and in its ability to wage war. Thus, every available man and woman who can in peace be applied to the making of national wealth must be given the opportunity to take a direct part in this pursuit. So we will tend to draw in our fighting men from the fringes of defence of the Commonwealth and the nation and to close them in on our peace-time national, creative activities, research and production. Their brains and their hands will be needed. The same policy will apply to the rest of our Commonwealth, which will draw in upon its "insular" fortress-areas as nearly as possible. Perhaps it is that today we enter Winwood Reade's age of Intellect of which he speaks in *The Martyrdom of Man*. We will need to concentrate all our intellect and not to waste any particle of it.

With these considerations in mind an objective study is now needed, therefore, in order to determine by what stages and in what manner we can change our present fighting services into the new shape. It may be said that the new era of war calls for dispersion in defence. While accepting this dictum it must be explained that dispersion in this sense means dispersion of some part of our war activities and so of our peace activities to the "insular" areas of the Commonwealth. Perhaps we have not yet come to look at our far-scattered lands as one single unit for warlike purposes. If the Commonwealth were organised for war in regional areas it would be more easy to see it as a whole for military calculations.

Today we are still committed to police work in various parts of the world and must keep the officers and men in that rôle. This may go on for a time yet, but we must beware that we do not confuse police work and its needs with the making of war and its needs. In the past we have confused them to the great detriment in the training and equipping of our war-making services and at an unnecessary cost to our nation.

All that is said here on the nature of our fighting services does not as a consequence mean that national service is now unnecessary or will later become unnecessary. Conscription of some sort may be needed in the days to come to enable the State to direct a proportion of its population into those occupations that it deems best for the increase of the nation's wealth and so of its strength for war, occupations that are in this respect more productive than those to which conscripts are sent today.

Here it is fitting to emphasise how important it is that our cadre of officers shall be intellectual men and scientifically inclined, for this is a deadly business in which they are engaged.

Science, or perhaps the engineers, had us in control between the World Wars and inevitably plunged us—all ignorant—into this latest torment. We must at long last gain control of science. As a soldier, I do most strongly press for some sort of central body for research and development in our services, representative of the main activities of learning and of material development in the nation as well as of all those men who have the making of war. This is necessary, but how much more necessary that we should have some central research body which can produce for us, from its fund of knowledge and experience, a national design for living that is ahead of all scientific developments. This could tell science what it is required to do, ensure opportune release of its discoveries and prepare us to assimilate scientific novelties into the national way of life. How much better this than that we should be left to permit science to dictate blindly to us how we shall live while unwittingly we slide down the old abysmal chasm to war.¹

More necessary still is it that there should be an international body of some sort. Over the face of the country we have the electric power grid; will there not be, over the face of the world at some future time, the nuclear power "grids", perhaps in the form of subsidiary power-plants from which

¹ G. M. Trevelyan in *English Social History*, speaking of the Industrial Revolution in England of the late 18th and early 19th centuries, says, "Man had acquired formidable tools for refashioning his life before he had given the least thought to the question of what sort of life it would be well for him to fashion."

this power can be distributed by whatever is the best means? The subsidiary power-plants would presumably be offshoots from the main international plants.

Can we not start thinking in terms of the improvement of this world in which we live rather than in terms of improvement within just one nation or some unified region? There are great spaces of the earth which are desert and which, with the new resources now come to our hands, can be made to blossom into fertility. Imagination builds yet other great projects. Surely we can form some international body which will direct the energies of all nations towards these great improvements in the world which no single nation can undertake, and so divert the attentions of nations from the greedy desire to snatch from each other those things which they feel they like and have no means of acquiring by peaceful methods.

Now that we are speaking of international control it is well to admit that it is as impossible to stop men from making research into nuclear energy as it is to stop them from thinking dangerous thoughts. It seems to me that the most we can do is to make it of little benefit to them to continue the research and thus reduce the numbers of independent research workers and national laboratories to a controllable figure. There may be other means of doing this, but I suggest that one way is to equip lavishly and control efficiently an international research establishment that will constantly be many leagues ahead of any independent national or group or individual study of the subject. This establishment must pay—and pay highly—to buy up all the best scientific brains in the world. Periodically its findings must go out to all whom they may concern. Is it beyond the bounds of what is practicable that all research of this sort which is outside this establishment must be licensed so that a check can be kept in the same way as is the check on illicit distillation and on the drug traffic? One thing that is certain is that with the discovery of more and more sources of raw material it is quite impossible to control the production of raw material for conversion into nuclear or some other devastating energy. In the end it will be found all over the world in considerable quantities.

In close touch with the international establishment there should be all other international research associations, for we are at a time when discoveries are in rapid succession to foreshadow the coming changes in our way of life and, as I have said, we must be in control of scientific development. If we are not, then no new development must be released to the world or to any nation until they are ready to use it beneficially. To be ready for it means, among many other things, that we must be able and willing to control its direction, its uses, and its power.

If there is to be an international establishment to produce all new energies, then from it will come the most up-to-date types of bombardment weapons, so it seems logical that at that establishment these weapons should be made and from that establishment or from branch establishments under its control, they shall be fought. Lacking these latest bombardment weapons the nation which attempts aggressive action against another will be at a sad disadvantage, for it will not only be wielding weapons of low efficiency but will also have no defence against the newest weapons, internationally produced and fought. Without national fighting power, a nation must, I think, before long cease to be a nation, for it has no ultimate physical barrier to erect against any other nation and no physical means of imposing its will on another.

As developments proceed it is probable that from time to time the most valuable sources of raw material will be found in one area and then, perhaps, exclusively in another, until we discover how to use the more common elements. Since energy is the most important material thing of today it is inexpedient that, as with oil, any country or group of countries should be allowed to keep its monopoly. I do, however, hold that for some time yet the democratic nations shall do all they can to monopolise any raw material on which they can lay their hands. In the end, however, I envisage all sources of energy being available to all people of the world. In any case, if the transformation of the raw material into energy can be done efficiently only at the central international establishment, then monopoly by a single nation can at once be controlled.

It is to be hoped that this central establishment will not release a new discovery until society is ready to accept and use it beneficially.

There should be—or will be—a great increase in the material well-being of all peoples. It is, of course, questionable whether, in the great scheme of things, this is for the best. The more our property and material encumbrances are increased, while at the same time our physical and moral burdens and hardships are diminished, the less will be our spiritual well-being and improvement. This is a grave defect for the development of the courage and endurance that will be demanded if ever war is again forced upon us. More often than one can quote, history shows that frugal and hardy peoples such as the tough horsemen of Jenghiz Khan have rolled over the lands and peoples of more prosperous and less hardy nations. Perhaps not merely the toughness and physical courage of the past will be needed for any future testing time: maybe we shall need some other form of these qualities.

One thing does seem certain, however, and it is that both nationally and internationally we badly need some body that will set out for us the new “design for living”, and that that body must have the co-operation of philosophers and students of ethics.

In this chapter I have striven to show how useless it now is to go to war, and yet how probable it is that irresponsible nations will again wish to fight. If they must fight, then I have tried to show what the nature of war will be, and lastly what immediate means there may be to prevent the power to handle the most deadly weapons from getting into the hands of the wrong people.

Finally, we know that there is only one way by which war can ever be stopped. It is that all national boundaries shall be eliminated once and for all, that all nations shall circulate freely throughout the world, so that we shall thus all become world citizens. Science has in reality made us all citizens of the Universe, but we still lag behind science, in that we are not yet even citizens of our own world. Here in our hands is surely a great instrument by the use of which, using all other means as

well, we can wipe out all these boundaries and can regard this whole world of ours as really our own territory, to be improved for the well-being of all Humanity. I do not know of any matter placed on the agenda at any meetings of any Foreign Ministers which^{*} can bear comparison in importance with this one great problem. Its solution we must find at all cost in time and effort. Great Britain and the United States can set the example by being the first to unite, the first to break down their national barriers.

XIV

EPILOGUE

*Till the war-drum throbbed no longer, and the battle-flags were
furled
In the Parliament of man, the Federation of the World.*

Locksley Hall.

IT has always been a puzzlesome thing to me to decide whether it is better that warfare should go on or that it should cease for ever. A coward or a pure idealist will urge that war must now cease. I shall be told that any man of common sense will urge the same ; but this I do not accept, for he has to apply his common sense to a very difficult problem. I only hope that he has more faith in his answer to that problem than have I in mine. I, too, want all war to cease but at what stage in the evolution of this world I do not know. I do not see that it can or should cease here and now.

I am told that no good ever comes of war. Is that true ? The catastrophe of 1914-18 brought us here in Britain to a better understanding of our social responsibilities. It shook our complacent faith in the rightness of our existing social system. It made us poorer, which was all to the good. It brought us into closer contact with the U.S.A. ; better still, it brought the U.S.A. into closer contact with realities in the world outside America. It forced on the development of aircraft, wireless, medicine, and surgery. Were these all good things ? They ought to have been. War does not bring all bad : it brings some good.

It is too early to say how much or how little of good this latest war has brought to us.

War is not romantic but it does not bring out only the bestial in those who fight. It does bring out—demand—certain qualities that are very seldom called upon in peace in an ordered society such as the British. If war is never again to

be, will these qualities ever be demanded, will they not bit by bit disappear? Will men be called upon to display physical courage, the self-sacrifice and self-denial that the battlefield so often requires: the unselfishness and great endurance that wounds, scant rations and water, and sparse clothing in a rigorous climate inevitably demand? I do not know how peace-time pursuits can ever make such demands upon us except in a form too mild to strain us or mould our characters. Physical suffering there will be, but the suffering will seldom be more than that of the operation table or the dentist's chair, lightened by all means that science can employ. The days are past when a man goes to the gallows and the stake for his religious principles. The most that could happen to him is that the more pharisaic or the less believing will cold-shoulder him; the least, that no one will bother their heads over what they regard as his own private affair between himself and whatever Being he creates to his own satisfaction.

Social reformers have nowadays perhaps a little more to contend with, but none can suggest that their sufferings in a tolerant society such as ours can reach more than some feeling of frustration and of disappointment. If you wished to starve to get another shilling on the old-age pension of the oldest inhabitant you would be forcibly prevented from doing so, and the compulsory feeding might be the most painful part of your mild sufferings.

Where are we to find the struggle that moulds except in war? I cannot see it in any street of an English town or in her pleasant meadows and copses. The people are cosseted.

As a nation, I suppose that we could place upon ourselves restrictions, impositions, self-denials in the good cause of co-operation, in order that we might spare material things for other nations, but this in practice seems too rough and strait a way for any nation to go for long on the road to self-discipline. Furthermore, knowing the predatory ways of nations, surely a people that was so unselfish could expect a brief life in this tough world that we inhabit.

Another doubt assails me. Can we ever be rid of war so

long as an evildoer must be punished? The ultimate sanction of the law in any society is force, which comes less and less to be used as society becomes more law-abiding. That is to say that the evildoers become less or the violence of their crime diminishes. Four-fifths of the world today* is not at all law-abiding and the force necessary to keep law and order is a strong force. India's 350,000,000 people are kept from frequent clashes of mob violence, perhaps worse, by a considerable army. The intelligent but blind will say that the presence of the foreign government is the one irritant that urges people to the frantic pitch that leads to these outbursts. That is not so, as these idealists will before long discover. The people of India have a long and thorny way to tread before they can stay at peace within themselves without the help of some impartial agency. Perhaps the struggle along this arduous road may be the making of the people: let us hope that the habit of hate does not end it in dismal failure. Such a colossal collapse would endanger the whole world.

So the time may come when "policing" forces will have to be used to keep the peace in India. If that is so in India, then it may be expected to be so between other peoples of the world for some time yet to come. The threat of punishment by the rather milder nuclear weapons applied by international sanction will keep the peace, and such a threat is not tarred with the brush of super-power politics.

Except for armed policing there may be no need for any one of us to partake voluntarily in the risks that armed forces ordinarily have to face. Armed policing is not very dangerous work so long as one's weapons are of the best and there is no reason to suppose that they will not be of the best.

However, a different state of affairs comes about when a great power majestically declines to accept the decision of the International Council and with heavy and ominous step moves from its empty chair. Germany, Italy, Japan have all taken this course. Others will yet take it. At that point we know that there will be war and perhaps the loyal members will not have been warned of the failure of negotiations in time to prepare to defend themselves from the physical onslaught that

will follow. Therefore, there is no doubt that should any member refuse to accept the decision of the Council then that member must at once be forced by whatever means are necessary to accept it and to accept it quickly. There can be no quitting of the Council by any important member : quitting is too fatally dangerous for the rest.

It seems, then, that whatever the form our Parliament of Man may take, it must for a time have at its disposal and be ready to use even to the utmost an irresistible coercive power. The guilty nation must be driven to its punishment as is a criminal today and pushed there by such force that resistance is hopeless.

The organisation of this coercive force and the method of using it are both subjects for study in today's military science. We still need the military scientist and we will still need the "armed" man. We have not yet done with the risk of war : we shall not be done with it until all nations possess a keen national conscience. The younger officer of today is the man who must enter eagerly into this study of war, for many others are now by negligence and complacency unfitted for the army of the future.

As a man studies he finds that he must give out the results of his study : perhaps he may be impelled to write. He then faces criticism. The experience will do him no harm for it will rid him of his complacency, the curse of our forces and the killer of our men.

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